For John and Yasmine
from Michael
28.6.99

LIONEL SHARPLES PENROSE: A BIOGRAPHY

by

MICHAEL SMITH

ISBN 0 9535780 0 3

1999

Published by
Michael Smith (1922–)
19 St Clare Road, Colchester, Essex CO3 3SZ

Printed by
The Lavenham Press, Lavenham, Suffolk

Contents

		Page
Introduction	... ...	vii
Chapter One	Pedigree	1
Chapter Two	Outline of Life	6
Chapter Three	St. John's College, Cambridge and Vienna ...	17
Chapter Four	Family Life	21
Chapter Five	Colchester Survey and War Years	28
Chapter Six	Galton Centre, UCL	34
Chapter Seven	Diversifications	39
Chapter Eight	Harperbury Hospital	52
Chapter Nine	Lionel's Family	54
Envoi ...	... ...	56

Index of Illustrations

Fig. 1. Alexander, Lord Lieutenant of Cambridgeshire, from a portrait by his son-in-law, wearing academic gown (Hon Doctor of Law degree (LL.D) from Cambridge University in 1894 for "services to science and the cause of education".) He is holding one of his early printed bibles 2

Fig. 2. The Peckover and Penrose Family tree 3

Fig. 3. On hearing he had leukaemia 11

Fig. 4. Grave and headstone 16

Fig. 5. Woodcut by Lionel Penrose 18

Fig. 6. Thorington Hall by L.P. 23

Fig. 7. Piano at Thorington Hall 24

Fig. 8. Musical palindrome by L.P. 40

Fig. 9. Bookplate by L.P. 42

Fig. 10. Interlocking wooden models 43

Fig. 11. Model to show self replication, made with two types of element, A and B ... 44

Fig. 12. Drawings of perspective 45

Fig. 13. Drawing by Escher 46

Fig. 14. Derematoglyphics by L.P. 48

References

A list of the Papers and Correspondence of Lionel Sharples Penrose (1898–1972) held in the Manuscript Room, University College, London Library, compiled by M. Merrington, B. Blundell, T. Golder, J. Hogarth. Publications Office UCL 1979. ISBN 0 902137 24 7.

Other specific references quote in text.

A more detailed account of Lionel Penrose's scientific work is published by Marina Press, University College London (Email: Marina@galton.ucl.ac.uk), in a booklet entitled *Penrose: Pioneer in Human Genetics* December 1998, and contains the contributions of his colleagues to a symposium held in London on 12.3.98 and 13.3.98 on the twenty-fifth anniversary of his death. David C. Watt in *Notes Rec. R. Soc. Lond. 52* (1), 137–151 and (2), 339–354 1998 gives a further account of Penrose's work in genetics.

Acknowledgments

Acknowledgments for their help to: Oliver, Roger, and Jonathan Penrose; Shirley Hodgson; Joan Penrose; A. G. Bearn, Bessie Burton, A. M. Cooke, Valerie Cowie, R. Doll, J. Edwards, Ruth Hoffman, W. R. MacKibben, Frances Partridge, M. Ridler, Betty Robson, C. Smith, L. Smith, D. Watt.

Introduction

Lionel Sharples Penrose (1898–1972) had many threads in his life, which wove themselves together to form a rope of considerable strength and flexibility. Those whom the rope looped around, and those who hitched onto it, were elevated to a heightened perspective of life and offered new insights and enthusiasms, it seems without exception. Any attempt to tease too far apart the individual strands of that life risks losing the strength of the whole, but some separation must be made to appreciate the complexity of the weave.

It seems remarkable and yet apposite that someone possessing the acute intelligence which Penrose possessed should have spent the bulk of his working life exploring the minds and bodies of people at the other end of the scale of human faculties; there smacks something in this circumstance of the balance and proportions inherent in the disciplines of mathematics and of music, to both of which subjects Penrose was deeply committed.

Finally, the importance of genetics in the career of Homo Sapiens, a subject dear to Penrose's heart, could not require a better vindication of its relevance than that exhibited by the achievements of his own four children: two professors of mathematics, a British chess champion; and a consultant paediatrician and geneticist.

CHAPTER ONE

Pedigree of Lionel Penrose: Penrose; Peckover

The Penroses

James Doyle Penrose (1862–1932), Lionel's father, was descended from Penroses originating in Sithney, Cornwall in the eleventh century AD, and branches of the family became established in Yorkshire and in Waterford, Ireland in the seventeenth century. James Doyle Penrose was born in Michelstown, Ireland and was related to the Irish Waterford glass family. He became a noted artist, with portraiture and religious subjects as his chief skill; eventually he became a Fellow of the Royal Hibernian society. He was a Quaker, and at one time two of his portraits hung in The Friends House in Euston Road, London, but one was stolen and the other removed to a safer place.

The Peckovers

Edmund Peckover was a soldier in Cromwell's Roundhead Army who took his discharge in 1655 to join the Society of Friends (so called 'Quakers' because George Fox (1624–91) the founder, taught that believers should quake before the word of the Lord). Fox refused to take the oath of abjuration in 1655 and Edmund Peckover was one of nearly one thousand other Quakers who were imprisoned at that time for their beliefs. After his release Edmund Peckover settled in Fakenham, Norfolk. His descendants migrated to such places as London, Wells, Doncaster, Ipswich, Colchester, Yarmouth and Norwich, and Jonathan Peckover (1754–1833) moved to Wisbech in 1774, where he established his own grocery business at 25 High Street. The Quakers were scrupulously honest in their business dealings and became the first group of traders to display the prices of its wares. In 1777 he purchased Bank House, North Brink, which had been built in 1722, and such was his growing renown and prosperous solidity, that, in 1782, he was able to found the Gurney, Birkbeck, Peckover and Buxton bank. Eventually, in 1896, twenty private banks, including the Peckover's, merged to become Barclays Bank, the premises having been moved to a building in the Old

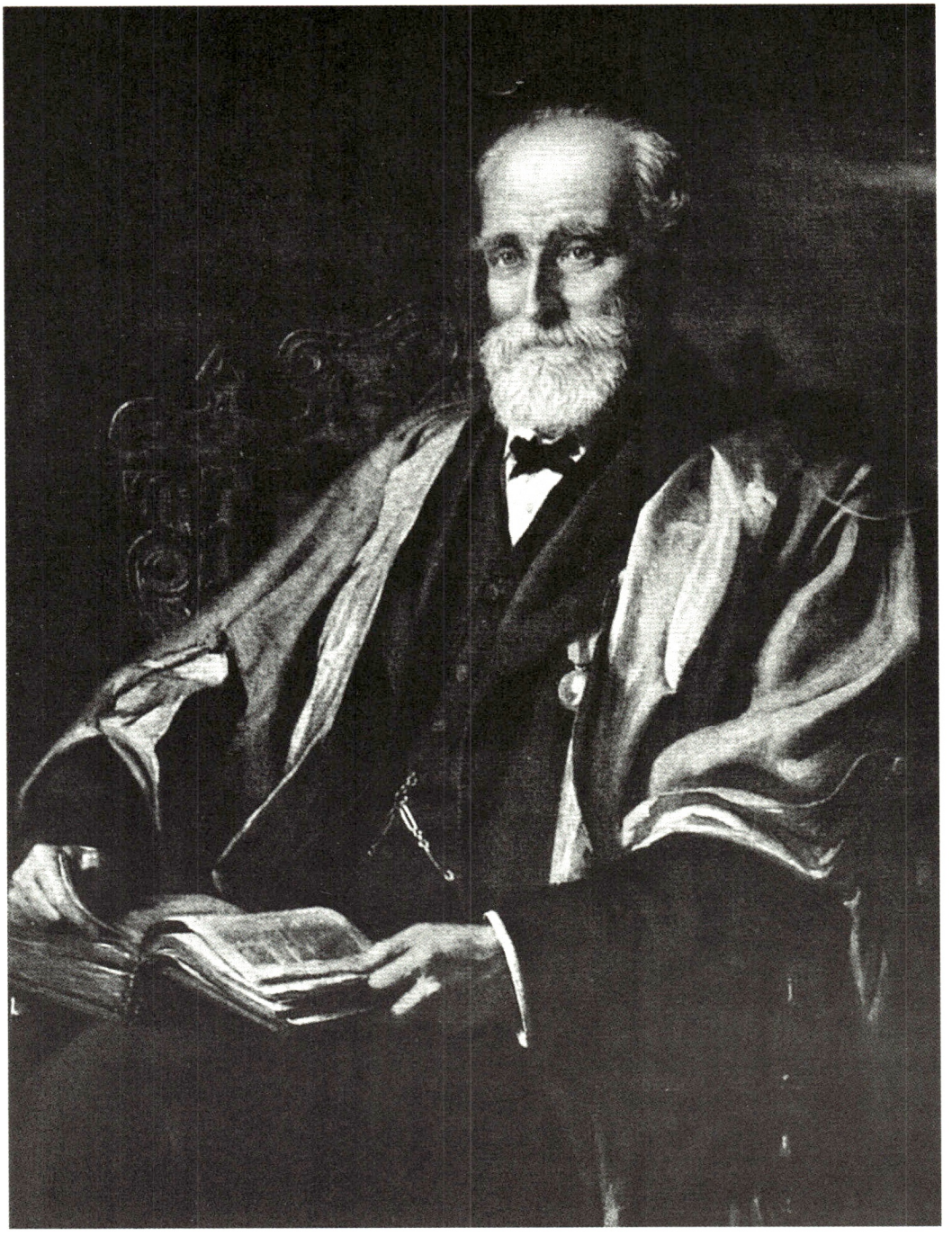


Fig. 1. Alexander, Lord Lieutenant of Cambridgeshire, from a portrait by his son-in-law, wearing academic gown (Hon Doctor of Law degree (LL.D) from Cambridge University in 1894 for "services to science and the cause of education".) He is holding one of his early printed bibles.

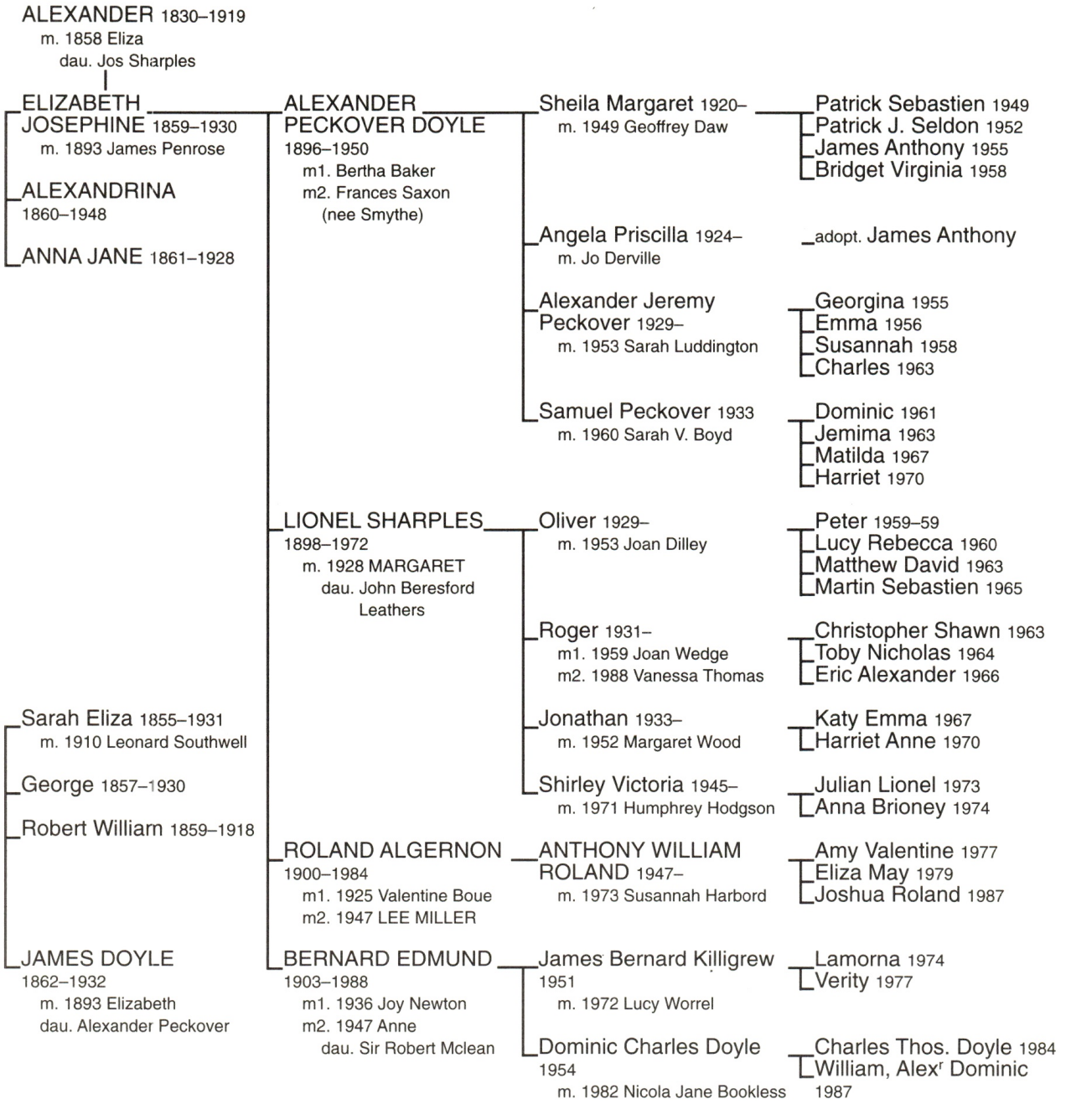


Fig. 2. The Peckover and Penrose Family tree.

Market, round the corner from Bank House, a building which still houses the present Wisbech branch of Barclays Bank.

Alexander Peckover (fig. 1) was made Baron Peckover of Wisbech in 1907 and one of his three daughters, Elizabeth Josephine, married James Doyle Penrose in 1893; they had four sons.

Lionel's mother, Elizabeth Josephine Peckover (1859–1930) (fig. 2), was the eldest daughter of Alexander and was brought up a Quaker. She became dedicated to peace organisations and foreign mission work. Her sister, Alexandrina (1860–1948), lived in Bank House which she gave to the National Trust in 1948 with 46 acres of land, and left more than half a million pounds, for which the four sons of her elder sister became the residuary legatees. The four sons of James Doyle Penrose and Elizabeth Josephine (nee Peckover) Penrose were (fig. 2: Family Tree).

Alexander Peckover Doyle Penrose (1896–1950), Lionel's oldest brother, was conventional and rather formal. He was, perhaps, the most socially ambitious of the four brothers, and the nearest to being a gentleman. All four brothers acquired nicknames considered by friends to reflect their perceived characteristics, but these were seldom used within the family: Alexander's nickname was 'Gentleman'. He married twice and had two sons and two daughters. After he was invalided out of the army in the First World War he farmed in Norfolk. He led the campaign to save the 15th Century Guildhall of St George in King's Lynn, Norfolk after the Second World War.

Lionel Sharples Penrose 'Looney' was the second son, (see Chapter 2).

Roland Algernon Penrose (1900–84) became a surrealist artist and a writer on art and was nicknamed 'Artist', although Lionel was apt to be scathing about his brother's artistic endeavours. Roland lived in France from 1922 to 1934 and studied art in Paris; he introduced the artists Man Ray and Picasso to the British public and masterminded the Surrealist Exhibition in 1936 and a Picasso Exhibition in 1960. He was the founder and first chairman of the Institute of Contemporary Art in 1947, and became a member of the Fine Arts Panel and a Trustee of the Tate Gallery in 1959–1966. He became involved as a camouflage expert in World War II. In 1925 he married Valentine, the marriage being annulled in 1939, and he married Lee Miller in 1947, with one son from the latter union. Lee was said to have painted herself green once, possibly inspired by the camouflage motif. In 1995 an award from the National Lottery enabled the purchase of 26 paintings and drawings from the estate of Sir Roland Penrose to be displayed in the Scottish National Gallery of Modern Art, including works by Picasso, Miro, Dali and Magritte.

Bernard Edmund Penrose (1903–1988), known as 'Beakus', after Bunny Beak the comic strip character, or 'Sailor', took to the sea, at first as an able seaman at Brixham, Devon. He was not clever intellectually, but Lionel was extremely fond of him and admired his good taste. Bernard married Joy, the sister of Robert Newton's first wife, in 1936 and remarried in 1948, this time Ann, Robert Newton's former wife, and had two sons by the second marriage. He owned a trawler, the Sans Pareil, which was described by Dora Carrington in 1928 as 'an infinitely romantic ship with brown varnished shipboards and cut glass handles, and a little fireplace with its own brass mantelpiece.' His love life was turbulent at times, and Roger Penrose, Lionel's second son, recalls an occasion when he was staying at Roland's house in 1945 and was woken by the sounds of broken glass and the drunken voice of Joy, Bernard's first wife, shouting, 'open the fucking door, I hate all the Penroses'. The police were called and peace eventually descended. Beakus served in World War II from 1939–45, and skippered one of the last three-masted schooners round the Horn. Later he lived near Truro in Cornwall, the Penrose's ancestral home.

Bank House, Wisbech, where Alexander lived, was frequently visited by his four grandsons, and Roland Penrose recalled that the contents of the home and the collections of precious objects which Alexander had amassed made an unforgettable impact. "The smell of cedar-lined drawers . . . the stare of glass-fronted cabinets teeming with their precious paraphernalia were haunting. The locked cases contained careful arrangements of innumerable curiosities drawn up like royalty at the saluting base: Mummies, coins, walking sticks . . . water from the Jordan, watches, rhino horns, specimens of the smallest in the world or the largest of unlikely objects, and all meticulously preserved, dusted and dominated by my grandfather's commanding voice booming incessantly at the young, 'keep off dirty paws'."

Stern observances of conduct were reinforced, with little expression of feeling, and on Sundays the reading of fiction, attendance at theatres or musical concerts were forbidden. Chess, which Alexander was fond of, and card games were allowed, but the king, queen and jack cards were proscribed and replaced by the inoffensive numbers 11, 12 and 13. Alexander died in 1919 aged eighty-nine and his daughters Anna Jane and Alexandrina continue to live in the family home, Alexandrina surviving until 1948. She left a sum of more than half a million pounds, the four grandsons being the residuary legatees, and gave the house, now called Peckover House, to the National Trust, encouraged in particular by Lionel.

CHAPTER TWO

Outline of the Life of Lionel Sharples Penrose (1898–1972)

The Years 1898–1908

Lionel was born at 44 Finchley Road, London on 11.6.1898.

Early in life Lionel showed evidence of an active and enquiring mind, and a liking for drawing and charting things on paper. He took to drawing from a few years old and made pencil drawings of flowers when he was five and pictures in crayon in the following years, and kept a neat conduct chart and a detailed getting-up-in-the-morning chart to record who among the four brothers was the fastest; his own chart read: won, quick, slow, won and slow.

He wrote some poetry, which included a poem about the battle with sin: "We will march onward to battle/When our captain's voice is heard;/ With the banner high and the victory nigh/We fight for our Master and Lord." The espousal of pacifism had not yet taken the firm grip it later established on him. A more pacific poem called The Valley, the last stanza of which was, "You be just like this sweet valley/And whatever may crop up/Be just the same as usual/Drinking from its precious cup." However, Peace was a concern for him, even when he was only eight, "We are under one King. Let our flag be peace,/Let us take our swords off/ And let the bloodshed cease."

Lionel went to the Downs School, Colwall, near Malvern from 1908–1911 and while there he pressed flowers in books and made drawings of insects and notes about animals. A prescient report from Herbert Jones, his headmaster, in 1909 says, "Lionel is a very interesting little fellow, loveable and affectionate, but with this little kink in his character which is giving, and probably will give, for years to come, a good deal of trouble to him before he succeeds in finally straightening it all out. It is very reassuring to feel confident that he really cares, even when he hides his deeper feelings under a mask of indifference."

Lionel transferred to Leighton Park School, Reading from 1911–16, where the usual number of boys in a form at the school was seven or eight, and religious topics and physics and algebra joined his other

interests, followed by music. He composed a minuet and trio and a double chant in canon, and was warmly encouraged for his effort by the school judges.

Lionel's school reports were mostly good and he was awarded a scholarship in 1912. He features in a gymnastics competition which the school won and was "pretty good" in a chess tournament in 1912. In view of subsequent achievements it is interesting that at that time his mathematics report stated that in arithmetic he was slow but accurate, his improvement in algebra was imperceptible and in geometry he failed to grasp the principles of the subject. However things improved and Evans, the Leighton Park headmaster, wrote in 1913: "the more I see of him the more I consider Lionel a boy of real promise". By 1915 it was also reported, "without effort he can keep at the head of the form," but also, "His attitude towards life is two-fold: One side is seen in the tone and temper of the J. B. Hodgkins competition; the other in the trivial argument with which he will defend his own courses and conceptions of conduct."

His brothers joined him in "Entertainments Programmes" at the school, and Lionel and Roland played duets, Lionel on the piano and Roland on the 'cello. When the school built an observatory, Lionel calibrated the telescope.

After leaving school in 1917 he joined the Friends' No. 5 Ambulance Train of the British Red Cross and served in France from early in 1918 until Christmas of that year. While in France he made pencil and charcoal sketches of such places as Cambrai, Amiens and Arras, showing the havoc of war.

It was also while he was in France that he attended a lecture on Freud and his teachings, and in particular the interpretation of dreams, which made a great impression on him. He wrote, "I was astonished to hear that some fairly reasonable explanation could be given to the apparently disordered sequence of ideas in the nocturnal theatre with an audience of one." He was discharged from the ambulance unit in January 1919.

Adulthood

As an adult Lionel was small in stature but well-built, brisk and nimble. His deep-set blue eyes were a striking feature under prominent eyebrows, to the extent of almost giving him a simian look (David Garnett). He was a dog-man (Frances Partridge), leaning forward eagerly to talk to you, although at other times he would mumble. He had a good sense of

humour, revealing an even set of teeth when he grinned, and disliked pretentiousness, which was probably one of the reasons he got on so well with mentally backward people. A colleague of his, Dr Benjekar, observed of Penrose, "There may not have been much of him below the neck, but there was a lot above." He played with ideas as a kitten plays with a cotton reel.

He cared little for what he wore, tending to stick to the same old jackets and trousers, the latter sometimes kept up with a tie, and reluctantly dashing off to a shop to buy new clothes only when it became imperative. His manipulations when stuffing his pipe with his herbal tobacco obtained from Heath and Heather in St. Albans and produced from an old brown paper bag and then lighting the loosely-textured mixture resulted in a brisk ignition, the sparks from which burnt holes in the V-necked pullover he wore on most occasions (Valerie Cowie). His own self-wound cigarettes exhibited a similarly brisk combustion. He had switched from ordinary tobacco to herbal tobacco when he was one of the first to hear of and recognise the importance of Sir Richard Doll's pioneering work linking the smoking of tobacco with cancer of the lung. Penrose maintained, quite correctly, that herbal tobacco had yet to be shown to be likewise inculpated, and conveniently disregarded, with a twinkle in his eye, that it had not been put to the test. Likewise, he was cavalier about what he ate, although extremely hospitable. He tended to constrain his emotions, which he considered one should not bring in to work (Betty Robson), although they were there under the surface, and now and then came to the boil. If he set his sights on reaching a certain spot for a walk, for instance, woe betide the party if the members fell short. Again, he had a low tolerance for slackness, as when a Baedeker Guide Book was mislaid (Jonathan Penrose).

His keen sense of humour and mischief were displayed on many occasions; if he did not like someone who was calling at the Galton Laboratory where he worked he would say to a colleague, with a twinkle in his eye, "Your friend is coming. don't show him in here" (Betty Robson), but he could be difficult in committees. On the other hand, he was an extremely humane man and tolerant of the frailties and defects of people. He approved of Terence's statement: "Homo sum et nihil human mihi puto. I am a man; there is nothing touching Man which is not my concern." (Shapiro, A, the Lionel Penrose memorial meeting, Mental Deficiency Section, Royal Society of Medicine, 1973, 125, 517–520). He could calculate when teasing was in order and would say gently, with a mischievous smile

when host to Ruth Hoffman, whom he knew to be a Jew, "Do you eat ham?" She was an assimilated Jew, and replied that she did eat ham. Lionel knew this really, but he 'had it in for the orthodox'. He would have been too sensitive to say such a thing otherwise.

His character has been described as a wonderful blend of reticence, commitment, stubbornness, humour, generosity and caution, a variety reflected in the diversity of juices which would be mixed together in a large ewer at parties. He had been his mother's favourite and, perhaps as a consequence, needed to be a star in company, a role his eminent abilities enabled him to fulfil quite easily at most times. On the rare occasions when this was not so he could get into a rage, and stamp his feet petulantly. He liked flattery, and being the brightest of the four brothers, he became accustomed to it; his wife Margaret flattered him, genuinely regarding him as a genius. She had been very fond of her father, more so than of her mother, and perhaps some of this admiration was transferred to her husband. She was the one who tended to take the blame if things went wrong. She told Frances Partridge that Lionel always got his own way. He had a complete inability to dissemble, which caused some anguish at times. Margaret held her own in France, where she was the more proficient with the language, while Lionel held a similar sway in Germany.

He was not adverse to what one might term minor domestic manoeuvres to establish and maintain his own position in the family. For instance, on greeting a new member of the family circle, he might shake hands in such a way that he could inspect the thumb prints of that person, although he would not refer to it himself; Margaret would be the one to explain the peculiar look which he bestowed on the thumb. Again, he would avoid discussion of emotional matters if he so wished, showing great skill in this matter, but would then demonstrate his emotional commitment to that person, by, for instance, accompanying them, at some personal inconvenience, to their destination.

Although he knew the names of the trees in his Thorington garden, and drew them with great care and skill, and planted them himself, he did not indulge in the more humdrum tasks of gardening, and it was Margaret who planted the flowers; nor was he assiduous with household chores, his indifference to what he ate standing him in good stead in that respect. Margaret, too, was not interested in haute cuisine, preferring more plebeian dishes. The household equipment would be unsophisticated; for instance, Margaret made do with an old metal iron for the clothes, not out of any parsimony, but from a belief in the virtue of basic utensils.

When Lionel wrote his articles and papers he usually did so standing, writing them out in longhand more often than not.

In 1958 Lionel went on a North American tour with Margaret and Shirley, his daughter. They were booked first class and found this irksome and embarrassing. It was on that trip that Penrose heard, with delight, the pianist playing a Bach fugue, as referred to in the musical section of Chapter 6.

Penrose travelled again to America in 1960 to receive the Lasker Award, where he read a paper on 'Mosaicism in Mongolism' The presentation of a glass eagle on silver stand was made by President Johnson and Penrose describes his difficulty in holding on to the silver base and the glass American Bald Eagle, for such it was, in the press of the crowd, and how it could not be conveniently stowed in his pocket. James van Gundia Neel, an American Geneticist, was the other recipient of an eagle. Penrose commented of the visit that seven days in the US seemed like an eternity. Nor was he enamoured of American politicians at the time, and this disaffection grew in his mind to contaminate the trophy he had received, so that when he returned to Britain he handed the eagle over to a charity shop. Later Neel was passing by the very shop and was amazed to see the eagle confronting him in the window. He went in and bought it. Later, when he met Penrose, he expressed his dismay and astonishment to find it under such circumstances; Penrose kept his own counsel.

Last Years

Illness made its first serious entrance in Lionel's life in the 1960s and was discovered under circumstances of some irony. It had been found that mongol patients had leukocytes which showed enhanced enzyme activity and, in order to substantiate this, Lionel was one of the volunteers to give their blood for normal controls. However, in Lionel's case, his blood was not normal and a diagnosis of chronic lymphatic leukaemia was made. This came as a shock to Lionel (fig. 3), but he did not need treatment and he refused to let the condition seriously interfere with his life.

During his last few years he developed angina, but again he popped his tablets in his mouth when required and carried on as normally as he could. Indeed, when Dr Mackibben, as a young registrar, offered to carry his case when Lionel arrived at the Harperbury Hospital one day, Lionel insisted on carrying it himself.

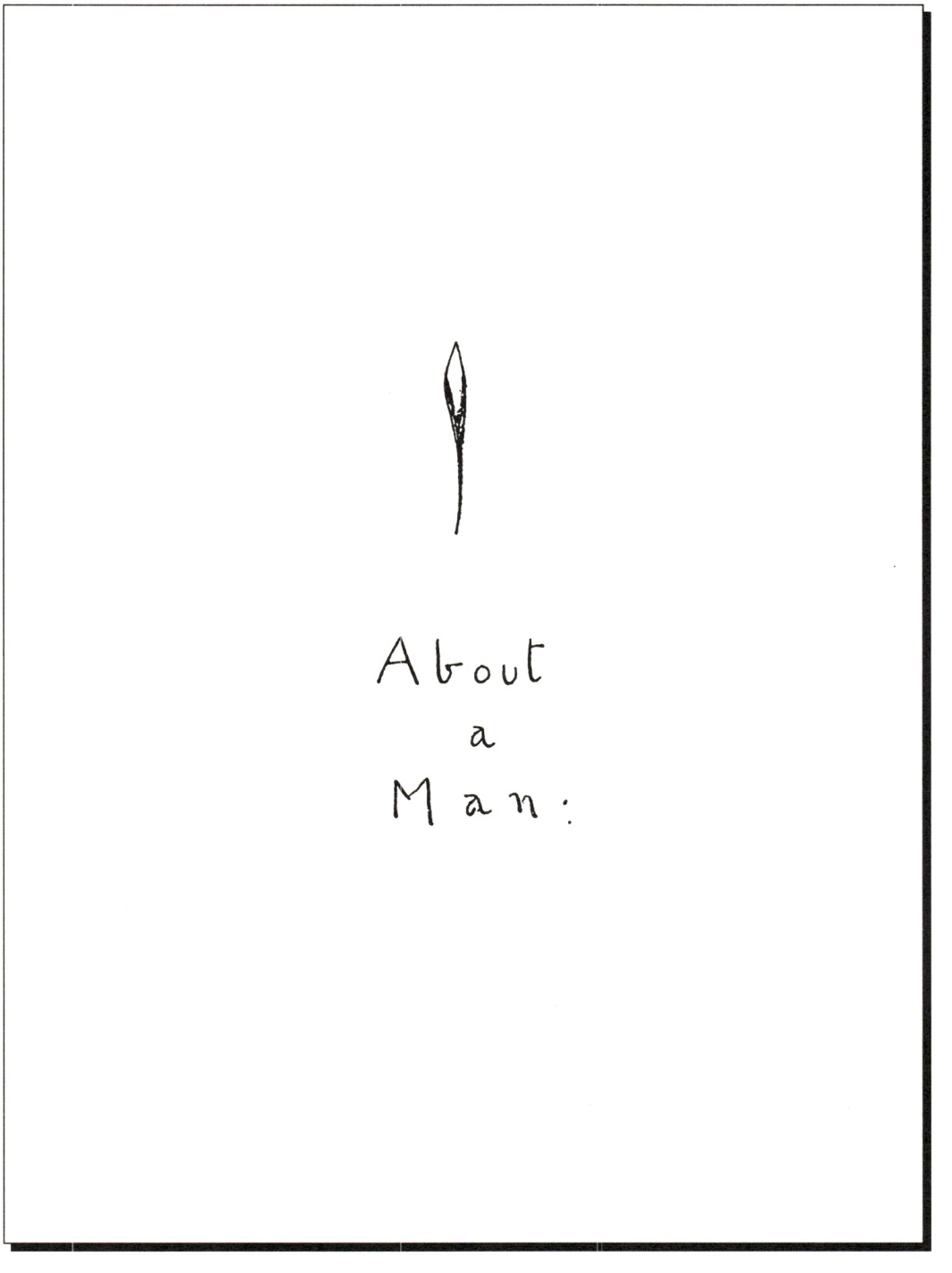
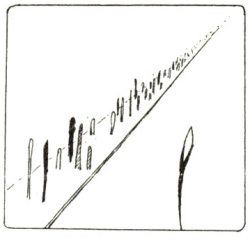


Fig. 3. On hearing he had leukaemia.

2.



He went into the street.
Uglier and more stupid people
than he, were to go on living.
The children he envied most—
They had a long time before them.

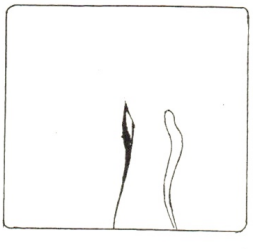
3.

A boy was selling newspapers:
But politics were no use to him now,
And he was growing weary.
He bought a toy from an old man.

4.

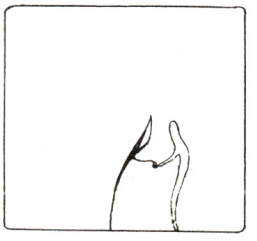
Then he saw, among the crowd,
Someone known to him.
She was able to spend
a short time with him.

5.



He did not tell her
What the doctor had said.
She spoke of the future;
Dances — a new play — Opera —
He did not say he would not be there.
He only looked at her.

6.

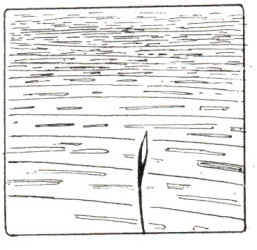


He gave her what he had bought
from the old man.
She smiled.
Then she had to say good-bye.
He did not tell her
That it was the last time.

7.

Then she went back to the world
Which he was leaving.
He became oppressed by
Thoughts about her
And all those other people who
lived in that world.

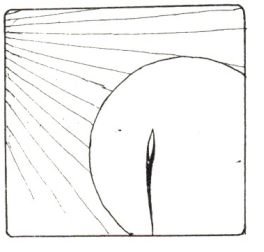
8.



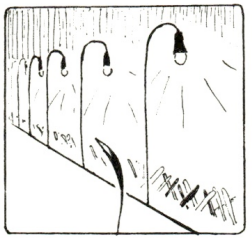
They would all have to die.
Their work would all go, with them.
Art would die too.

9.

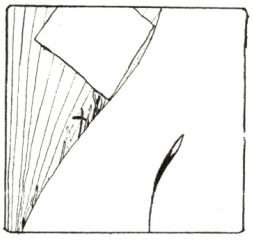
UNIVERSITY COLLEGE LONDON
8/1
PENROSE PAPERS



The earth itself would be soon dead.
Thus all life was doomed:
What then was its use?

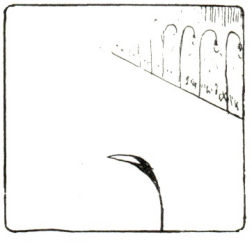


Why did these people hurry?
What were the glaring lights?
He could not see why people
wanted to live
If all must eventually die.



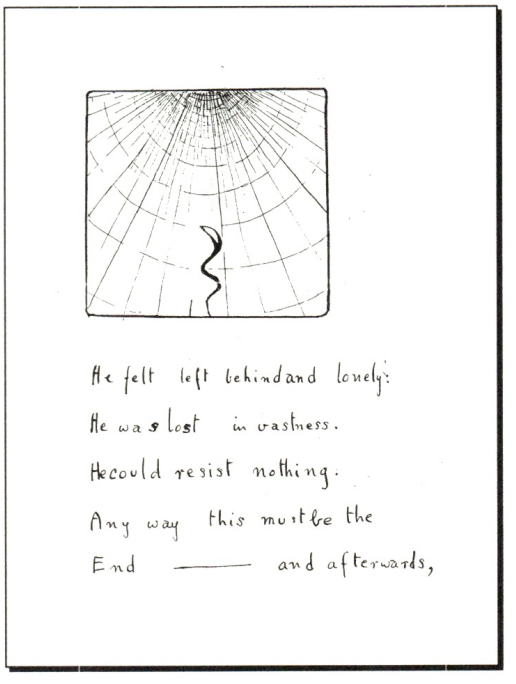
An invincible desire
Must be theirs.
Was it for Beauty or Love?
But the odds against them were ··
Terrifying.
It was a lost game.
To see this would save them trouble.

The struggle should be given up.
Why had not this been done
Before he was born?
He would then not have to die.
But perhaps he preferred to have lived
Rather than not to have lived.



UNIVERSITY COLLEGE LONDON
PENROSE

But he was tired now;
And since he could fight
no longer,
He ceased to belong to the world.
He was dropping away from it.


He felt left behind and lonely:
He was lost in vastness.
He could resist nothing.
Any way this must be the
End ——— and afterwards,
He would be able
To Rest.

He died in 1972 and was buried at Jordans, the Quaker centre (fig. 4), where he shares a simple gravestone with his mother. At a Peckover reunion, Margaret made a speech about what it was like to be married into the Peckover family and instanced certain episodes, such as pouring away into a fountain the vintage part, which was proscribed by their rigorous tenets.

His widow, Margaret, married Max Newman, a long-standing friend of both Margaret and Lionel, in 1973. Newman was a distinguished mathematician and an FRS who had worked at Bletchley Park in the Second World War, and had known Lionel at Cambridge and then accompanied him to Vienna. Newman developed Alzheimer's Disease during the last two years of his life before he died in 1984. Margaret lived until 1989 and was buried at Comberton, near Cambridge.

Fig. 4. Grave and headstone.

CHAPTER THREE

St. John's College, Cambridge 1919–21 Vienna 1922–3

Lionel joined St. John's College, Cambridge, in 1919 to read the Moral Science Tripos, enjoying the mathematics and logic under Bertrand Russell among others, and the psychology, but not the philosophy, which he averred he could not understand. However, he became a member of the Society of the Apostles and was an admirer of George Edward Moore (1853–1948). He also met W. H. R. Rivers (1864–1922), anthropologist, neurophysicist and Freudian, who had treated Robert Graves, Wilfred Owen and Siegfried Sassoon for shell shock at Craiglockhart Hospital, Edinburgh, Scotland, during the First World War, and whose activities have recently featured in the Booker Prize winner of 1995, 'The Ghost Road' by Pat Barker.

He recalls that he attended lectures given by G. Dawes Hicks to divinity students on sensation, during which the lecturer on one occasion described some phenomenon difficult to explain on physical laws. Lionel recorded Hick's mode of delivery, which was frequently interspersed with the interjection, 'I say', and when Hicks mentioned that the existence of God had been evoked by some to explain this particular phenomenon which he was discussing he added, "Few people, I say, few, I say, people would fall back, I say, upon so desperate a hypothesis." Lionel obtained a first class degree in part II of his Tripos in 1921, and was awarded the Newcombe Prize and a Foundation Scholarship at St. John's.

He took to executing woodcut pictures in his spare time at Cambridge, and when the Oresteia was presented at The New Theatre, Cambridge in 1921 the scenery and costumes were by Alex Penrose assisted by Roland Penrose, with a woodcut by Lionel illustrating the programme notice (fig. 5).

Lionel met John Rickman, an old Leightonian and presently a physician, on King's Parade in 1919. The latter now had long black hair and a moustache. He had just returned from a visit to Russia, and said to Lionel, "They think I'm a Bolshevik." He was working at Fulbourne Asylum and told Lionel that the only difference between him and the patients was that he had a key and they did not.

NEW THEATRE, CAMBRIDGE, LTD

MANAGING DIRECTOR - W. B. REDFERN, J.P., D.L.
RESIDENT MANAGER - P. H. ADAMS
SECRETARY - - - H. SLATER, A.C.I.S.

The Oresteian Trilogy of Aeschylus

AGAMEMNON
CHOEPHOROE
EUMENIDES

acted, in the Original Greek, by

MEMBERS OF THE UNIVERSITY

BY KIND PERMISSION OF THE VICE-CHANCELLOR

at 8 P.M. on

WEDNESDAY, MARCH	2	MONDAY, MARCH	7
THURSDAY „	3	TUESDAY „	8
FRIDAY „	4		
SATURDAY „	5	WEDNESDAY „	9

and at 2 P.M. on

SATURDAY, MARCH 5 AND WEDNESDAY, MARCH 9

1921

Price [redacted]

UNIVERSITY COLLEGE LONDON
8/14
PENROSE PAPERS

Fig. 5. Woodcut by Lionel Penrose.

After a year of psychology research under F. C. Bartlett concerned with sensory perception in his experimental psychology laboratory at Cambridge, Lionel went to the University of Vienna to study memory and perception in E. Buhler's laboratory, Rickman having preceded him there in 1922 and Newman following. While in Vienna in 1922 he met Sigmund Freud (1856–1939) and underwent some analysis sessions with Bernfield, as well as joining in the discussions of The Vienna Group, which included Rank, Federn, James Strachey (who translated much of Freud's work into English) and Ernest Jones.

Strachey drew Lionel aside one day and whispered, "Freud seems to be a very bad analyst because he reveals no close sympathy with the patients – he doesn't give a sense of caring." When asked why he sat on a chair behind his patient's head, Freud related that he found himself betraying expressions of amusement at some of the patient's remarks and did this to avoid his face being seen. Years later, when Margaret was having psychoanalysis, she told Valerie Cowie that she heard a clicking noise coming from behind her head. She wondered what it was, and when she turned round she found her analyst was knitting. Years later Anna Freud held seminars on psychoanalysis in the Freud house at Hampstead. Once, Valerie lay down on the sacred couch while waiting for Anna to appear. Suddenly Anna came in and remarked, "We must get on with the seminar." She was not angry on that occasion, nor on another occasion, when a student doused out his cigarette on what he thought was an ashtray, but which was, in fact, one of Freud's precious Egyptian wood carvings.

Lionel found in Vienna amusement as well as critical discussion. On one occasion Federn told him, "I am very fond of treating psychotics." "Good heavens, how do you treat them?" Lionel exclaimed. "I give them plenty of sweets,' was the reply. (The View from The Couch, Sunday Times Colour Supplement, 21.3.71, pp. 54–56).

Later he became sceptical of psychoanalysis, and observed of its results that it 'led to the acquisition of a quiet effrontery'. Nevertheless, on his return to England he did work as an analyst at the London Clinic for Psychoanalysis for a short while during his early medical student days. He had taken the decision to study medicine and so, after per-clinical work at Cambridge, he enrolled at St. Thomas' Hospital, studying there from 1926 until 1929, qualifying MRSC LRCP in 1928. His rapid progress towards qualification is referred to by Margaret, his future wife, in the following terms: "Lionel did the first three years of medicine in one year by juggling

with his registration dates, and in the end I qualified in medicine only three months before he did. Meanwhile he had brought me an orchid in a Chanti bottle and thereafter we had supper together almost nightly for the duration of our respective student days'.

He was awarded the Bristowe Medal for pathology in 1929 and started his medical career as a research student at the City Mental Hospital, Cardiff, whence he produced his MD thesis on schizophrenia in 1930, studying the case histories of some 80 schizophrenics. One particular schizophrenic, aged 22, had established his own complete mental universe in a series of notebooks and Lionel was very interested in this patient's reasoning.

CHAPTER FOUR

Family Life

Lionel first met his wife-to-be, Margaret Leathes (1901–89), at Zelt-am-See, when they climbed the Gross Glocker together with Austin Robinson and his wife.

Margaret was the only daughter of Professor John Beresford Leathes FRS, Professor of Physiology at Sheffield University and an expert on Latin, and it was when she was at Newnham College, Cambridge, that she and Lionel became more fully acquainted, eventually to marry in 1928, the year they both qualified as doctors.

Margaret's mother was disinclined to discuss her own family connections, and in particular her own mother, who was Russian with the surname Natanson, the same name, incidentally, as that of Freud's mother. Eventually Margaret found out that the family came from St. Petersburg, and much later the apartment where the Natanson's had lived was identified in a rather prestigious part of that city. Lionel had once tried to trace back Margaret's ancestry to Charles Darwin, but without convincing success.

Margaret was the first of the two to qualify as a doctor and liked to be addressed as doctor by acquaintances. She practised medicine in the King's Cross area for a short while after qualifying but, when her family of four started to arrive in 1929, she subsequently confined her medical activities to assessment of children for adoption and years later wrote articles about the illnesses of pets and whether owners of animals with cancer were more likely to suffer from cancer themselves as a consequence. Instead, she enjoyed playing music, particularly the 'cello, and became no mean exponent of chess, possibly outdoing Lionel in this. She gradually came to assume the role of a support to her outstanding spouse.

Thorington Hall

The family had lived at 47 Lexden Road, Colchester in the 1930s and in 1935 Thorington Hall in Suffolk was purchased from Sir Joshua Rowley for the sum of £1,125.00. An old leather shoe and a wooden recorder were found on the site the following year and Penrose gave the former to the

Colchester and Essex Museum. Later he collected medieval manuscripts which, on occasion, he lent to museums.

Weekends were often spent at Thorington during the summer months, with a longer stay during the summer holidays, mowing of the tennis court grass being an early priority. A carefully planned refurbishment of the house was undertaken in 1937 under the supervision of the architect Marshall Sisson, and in 1965 the house and grounds were given to the National Trust, with right of occupation during the life of Lionel Penrose.

Thorington Hall is a fine example of a Suffolk timber-framed farm house of the 17th Century (figs 6 & 7) and Lionel was not one to make lavish modernisational alterations; indeed the house contained only two small toilets and one bathroom in the main area, with another bathroom and toilet in the servants' quarters, while the family lived there, but it did have electricity. However, the constant cry from the stream of visitors who stayed there was of the cold. Eighteen elderly people who were evacuated to the house during the Blitz in 1940 decided they preferred the risks of the bombs to the coldness of the house, and soon departed. Likewise the wife of an American paediatrician who was staying there was seen surreptitiously to heap extra coals on the fire, there being no central heating, when she thought Lionel's attention was engaged elsewhere. It is said that Lionel was wont to remove any unburned fuel from the grate when bedtime arrived, sometimes even before. His motives for this appear to have been a compound of frugality, consideration for the unpleasantness of the miner's job and the notion that there was virtue in self-denial.

Frances Partridge stayed quite frequently at Thorington Hall in the 1960s with approbation for most things other than the heating. She had been a school chum with Margaret Leathes at Bedales and then they were students together at Newnham College, Cambridge. Frances rejoiced in their 'three-cornered colloquies', always lively and interesting. They had discussions of many different topics. She recalls that when thunder was heard as they were walking in the garden she noted that Margaret called them to go in, and Partridge makes the suggestion that intelligent people are often timid.

When the subject of the taking of drugs was mooted, Frances found Lionel less intolerant than Margaret. Lionel said that a person would have to take massive doses of LSD to affect the genes. Frances Partridge adored the Penrose's rather ramshackle life, with relaxed and casual meals, with the odd swig of whisky, stimulating conversation and the trio playing of Haydn. At other times they would site down together to correct the grammar of

Fig. 6. Thorington Hall by L.P.

Fig. 7. Piano at Thorington Hall.

anti-war articles by illiterate psychoanalysts for some pacifist magazine. "There is never a moment when one wonders what to say or do next," she writes (Good Company, Harper Collins 1994).

Lionel had written a paper on 'consciousness', and the thoughts it evoked in Frances kept her from sleeping that night. "Lionel approaches the subject like a scientists," she wrote, "and sets out strange patterns of facts, but then throws out hunches, which must be supported by facts."

The Penroses also owned a large house at 1 Rodborough Road, Golders Green, Hampstead, London, with the option of spending the weekends at Thorington Hall, Stoke-by-Nayland, Suffolk. The house at 1 Rodborough Road was large and rambling, and had been chosen after the Second World War principally because the cartoonist David Low lived next door. When David Low moved away Valerie Cowie and her family were invited to come as neighbours, but found other accommodation more suited to their circumstances at the time. The Penrose's hospitality was genuine but diffuse, so that guests could settle in without undue solicitation. Bedtime tended to be late and largely left to the whim of each person. Whether

Lionel's habit of sneezing at midnight should be taken as some sort of curfew remains speculative, but he himself usually stayed up until the early hours of the morning, even so still rising at the customary hour of 8 a.m.

David Garnett wrote a letter in 1961 asking whether his daughter Amaryllis could be a lodger at Rodborough Road; "She was arrested for sitting in Trafalgar Square, but I don't think she will do it again during term time."

In 1968 Mr and Mrs Burton, the caretakers throughout the family's time at Thorington, possessed a TV set, which the family would watch from time to time, but Julia Strachey, niece of Lytton Strachey, was irritated that the Penroses did not know how to work it properly. Another time Julia cut her bottom on a lavatory seat which was cracked, and raged at the lassitude in leaving it unattended to. She observed that the food was appalling and the housekeeping ditto; the house was just like a don's house, she raged. Julia had been a school chum with Margaret and Frances at Bedales, and she wrote to Frances in 1952 from Newcastle where she had encountered a family called Midgley who were similar to the Penrose family: "They live in a perfectly shattering bleak house and bad food, but delightfully warm, ingenious and brainy." Julia does not sound easy to please, and on another occasion wrote to Frances Partridge complaining that Margaret had rung her up and asked her when she wanted to come "in a practical rather than a welcoming way".

When he first met Lionel, Lytton Strachey had told Frances Partridge that he had not realised how intelligent Lionel was; Lionel combined an acute intelligence with a surprising diffidence. Frances Partridge had toothache while at Thorington Hall on one occasion and Lionel phoned up his dentist for an appointment for her; she was amazed how meekly he accepted the dentist's procrastination of arranging to see her. Similarly, Betty Robson, his successor at the Galton after Harry Harris, was amused to find, when she visited the Penroses at 1 Rodborough Road, London, that the deliberations as to which cinema to go to would be so fairly conducted as to jeopardise reaching the cinema in time to see the chosen film. Afterwards an eager discussion of the film eventually seen would ensue.

Students often stayed at Thorington Hall and at Rodborough Road, and there were times when the Penroses appeared to lose track of how many people were in the house at the time. It was even suggested that if they had encountered the supposed ghost at Thorington Hall they would have assumed it to be another guest. On one occasion John Bensusan-Butt and

his mother, Dr Ruth Bensusan-Butt, arrived to a meal and realised that the Penroses, who had already started theirs, had forgotten the invitation. Margaret immediately swept up the plates and disappeared into the kitchen where she divided the sausages into halves; duffel coats were kept on for the meal. Anita Lax, a Czech student who stayed with the Penroses at Rodborough Road in 1968, wrote the following account of Lionel in a school essay entitled, 'An Interesting Character': "He was an old professor of genetics (human genetics) but he may well just have been a professor of anything under the sun, beginning with music, mathematics, chess, art and ending with woodwork. He used to invent ingenious puzzles for his innumerable grandchildren and then he would make them from wood in his little workshop, always considering carefully the ages of 'all these little boys' which, as he said laughingly, 'changed every year and you had to be careful to keep track of them!'."

He lived in a tremendously large, old and extremely cold house, the number of rooms of which he could never remember. His equally absent-minded and exceptionally kind wife would continuously have several foreign students and other visitors staying (simply because they had nowhere else to go) but neither she nor the professor were quite sure who they were or whether they hadn't already left.

One of the rooms, however, was the professor's study, where, among the pictures, self-reproducing machines, puzzles and books, many of which he had written himself, there was a small 18th Century spinet on which he loved to play. While you were listening he would give you one of his ingenious puzzles 'to keep you amused'. If you managed to solve it (and what he never realised in his charming modesty was, that not everyone was endowed by a mind as great as his, his deep blue eyes would twinkle behind his spectacles and he would run off to bring you a new, slightly more difficult one, laughing in his very characteristic way. He found everything amusing, even the most difficult (or possibly particularly the most difficult) mathematical or scientific problem.

During their free weekends – and there were not many of these, because they were always organising doctors' meetings for the prevention of war, if not chess matches or amateur orchestras – he and his wife would go to Thorington where they had a beautiful old 16th Century home. On the way they would probably spend two hours on the road repairing the almost 16th Century car which very rarely reached any place without breaking down. (There was never any time to buy a new one – too many more useful things to do.)

Once at Thorington, the professor would settle down among the trees of the mysterious and beautiful old garden (he was always amused by the one with the roots growing upwards), equipped with crayons and sketching pad and would draw the most detailed and meticulous sketch of a plant or landscape. He always saw more in everything than anyone else did – by simply observing. His power of observation was one of his most prominent characteristics – whether it applied to his patients, colleagues or the kite he happened to be flying with the children. Then he would sit on a bench, in the same old brown-grey, worn little jacket which he always seemed to be wearing wherever he was, in his black, down-at-the-heel shoes, pull out a little notebook with a coloured cover, and start calculating the proving a recent mathematical law or working out a chess problem, or even inventing new games and 'machines' for his Mongol patients of whom he was so fond."

Journeys to Thorington Hall from London were undertaken in ancient cars which Lionel drove extremely slowly and somewhat haphazardly, and which were apt to break down. It seems that it was considered a needless expenditure of time to choose a new car. Margaret describes a strip in 1926 to witness the total eclipse of the sun on the Yorkshire hills. The drove their little Fiat car up the hill in reverse as that was the lowest gear, and camped on the top of the hill in tents. Margaret noted that the birds all stopped singing, just as the books had said it would happen. On train journeys Lionel said that the best way to strike up a conversation was to take your watch apart with a nail file and place the pieces in a match box.

CHAPTER FIVE

Colchester Survey 1931–39 and War Years 1939–45

In 1931 Lionel Penrose started his first major project, as Research Medical Officer sponsored jointly by the Research Medical Council (MRC), by Edmund Owners Lewis, a physician particularly interested in mental health problems and experimental psychology and by the Pinsent-Darwin Trust, with a remit to study mental defect at the Royal Eastern Counties Institute, Colchester. Ruth Darwin was the great-granddaughter of Charles Darwin and the principal of the trust which had been left by her father, Sir Horace Darwin. She wrote presciently to the MRC of Penrose, "He is not an administrator, but there is no doubt he is a thinker." Her father had owned and rented out the Royal Eastern Counties building. The building itself had suffered a chequered career; starting life as The Victorian Railway Hotel in the 1840s which, when potential customers were whisked off to the inns of Colchester by transport thoughtfully provided by the innkeepers, foundered as a hotel and changed its status to that of an asylum: the Royal Eastern Counties Asylum and, by the time that Penrose worked there, renamed the REC Institute; the building was finally abandoned and demolished in the 1980s.

It had been planned initially that Penrose should be the Medical Superintendent of the Institute but, in his forthright way, when asked about this, he replied that he considered the role of Medical Superintendent to be nothing more than that of a hotel manager, and was not among his ambitions, so he became research assistant, with Dr Douglas Turner as Medical Superintendent, with an annual income from various sources of £1,200.00. Penrose found Turner to be a "kindly man. His manner was direct and could be forcible, but he was always benign and his modesty seemed to be emphasised by a slight forward stoop."

Future applications for grants were sometimes frustrated by his forthright approach. He would submit a sparse outline of perhaps three succinct but short sentences for sums amounting to thousands of pounds. When challenged by Sir Richard Doll and others, he would reply, "They should know me by now." Luckily, they usually did.

In 1935 the male inpatients were all separated from the female patients and transferred to a new hospital nearby named Turner Village. Only mentally defective patients were admitted and no insane patients.

Penrose's visits to the Institute after the Second World War were conducted under less favourable circumstances. The Medical Superintendent then, Ralph Bates, was made of sterner stuff, living in a house rather appropriately called 'The Cannons', and preferred to shine alone in his particular firmament. Penrose would make fleeting, if not quite apprehensive, skirmishes to see his old colleagues with an outward pretence of disquiet lest the Superintendent should come upon them.

Penrose was given Miss D. Newlyn as his Laboratory Assistant and together between 1931 and 1938 they examined 1280 patients with mental defects and 6629 parents and siblings in more than 400 family histories, all the families being visited by a member of the team. The patients had been admitted to the RECI, one half by the local mental deficiency authority and the rest through various other agencies, and of these patients two-thirds were classified as feeble-minded and the rest as idiots or imbeciles. Each patient was examined for head measurements, height, weight, eye and hair colour, blood group and inspection of capillary blood vessels with a loupe; in addition the Stanford-Binet and Porteous Maze mental tests were done. It was considered that one half of the patients had a mixed aetiology for their condition and the remaining two quarters were either a sub-culture or secondary to some pathology. Penrose attempted to define pure clinical types, but many were considered to be a mixture of types. Some patients would not co-operate, fearing enforced sterilisation as a consequence of the examination.

The normal adult was considered to have the same intelligence as that of a normal fourteen year old child and the IQ of each person was the fraction of the patient's mental age in years over 14 multiplied by one hundred; i.e. an IQ of 100. The grading of mental deficiency in this scale was: dull for those with an IQ of 70+; simpletons 50–69; imbeciles 20–49; idiots 0–19. The average age of the patients was 24 (4–70) with a rate of 7–9% mental defect in the parents and siblings, compared with a rate of 6–8% in the general population, the figure being slightly higher in the parents than among the siblings of the patients.

Penrose suggested that mentally defective people suffered from neuroses as frequently as mentally normal people but the former were less able to hide it. Affective disorders, on the other hand, were less common in mental defectives, possibly due to a weak superego which therefore clashed less violently with the unconscious mind.

Of the one quarter of the patients whose mental deficiency was considered to be hereditary, examples of a dominant inheritance were those with Huntington's Chorea, neurofibromasosis and epiloia; and of a recessive inheritance cerebromacular degeneration, cretinism and phenylketonuria. Unfavourable dominant genes are eliminated from society more rapidly than are unfavourable recessive genes.

When phenylketonuria was discovered it caused the Medical Superintendent's eyes to light up, Penrose noted, because it was an example where the primary fault was in the liver and not in the brain, due to an abnormal amount of a chemical substance in the body, with the implication that these patients, at least, had the potentiality of normal brains if the biochemistry could be adjusted, and that they were not inherently mentally backward.

A Norwegian, Ivor Asbiorn Folling, had identified the phenylpyruvic acid in 1934, the affected urine turning a green colour if treated with iron trichloride, though the frequency of the condition was only 2 in 1000. Later the biochemist J. H. Quastel called it phenyleketonuria (PKU). Penrose tried to organise a phenylalanine-free diet, but the cost proved prohibitive and the patients lost weight and began to metabolise their own protein, with a consequent rise of phenylpyruvic acid in the urine. It was not until the 1960s that such a diet became practicable.

A particular study was made of 42 Down's Syndrome patients from Colchester and of 166 Mongols in all and a careful statistical analysis by Penrose elucidated the respective roles of maternal age, paternal age and order of birth, with only the former being casually related. He did this by assuming one particular factor to be the cause (maternal age, paternal age, birth order, interval since last birth) and then calculating the expected result for each factor and comparing it with the actual result.

Mongolism had been first recognised and described as a clinical entity by J. Langdon Haydon Down in 1866, who thought these patients showed a reversion to a Mongolian Kalmucks due to parental tuberculosis and Penrose later chose the label Down's Anomaly (later changed to Down's Syndrome) for the condition to avoid the possible ethnic offence of the original title. When he compared the blood groups of the Mongols with 225 other mental defectives he found the frequency of blood groups similar in the two categories, refuting the notion that they were a race apart. Penrose particularly liked Down's Syndrome patients, admiring their 'secret source of joy', and later he used to play with them in the kindergarten at the Galton Laboratory at UCL. Although he introduced the term, 'Down's Anomaly',

Penrose himself always referred to the patients as Mongols, not considering the term to be derogatory in his eyes. "See the happy Mongol He doesn't care a damn,/I wish I were a Mongol, My God, perhaps I am." Haldane had observed that Penrose would view the drawings of the Mongols with the same attention as he gave to the scientific studies of his colleagues. Although the Mongols could neither understand mathematics nor abstract thought, and had IQs of below 50, they could make drawings.

Penrose listed ten traits which Mongols might show, the possession of any four of which made the diagnosis very likely, and always inspected the hand and sole prints for the characteristic pattern of the syndrome.

Recently the French medical research agency Inserm has monitored 11,535 pregnancies resulting from artificial insemination in twenty-two fertility clinics across France, with sperm donors divided into age groups. Down's Syndrome was found in 1 in 714 babies from fathers who were under 35 years of age, 1 in 435 from fathers between thirty five and thirty nine years, and 1 in 244 from fathers over 39 years (New Scientist, July 1995), suggesting that the paternal age, as well as the maternal age, of the parents of Down's Syndrome children influenced the outcome of the pregnancy as regards frequency of the syndrome. It was also a Frenchman, Jerome Lejeune, who first saw the extra chromosome in Mongols, one of the 21 pair which had attached to chromosome 14, so that a gamete might have 11 (21) + 11 (14/21). This meant, as Penrose observed, that whereas a gene was too small to be seen, like mistakes by an imaginary printer, chromosome aberrations were like the mistakes of a binder.

1939–34 Ontario, Canada

In 1939 Penrose had finished his work at Colchester and accepted an invitation to lecture in America at Philadelphia. He took his family with him, probably on the lookout for further occupations in that continent, and possibly activated by his pacifist sympathies, and while in America was offered and accepted a post at Ontario in Canada, and later became Director of Psychiatric Research for the province of Ontario. His objective was to establish discriminants between psychotic and normal subjects, and to relate this to the knowledge of human genetics. To this end, Penrose developed non-verbal intelligence tests and pattern-perception tests, a branch of study extremely congenial to him. He studied over 8000 cases of psychiatric disorder, of which 1600 were treated, mainly affective disease and schizophrenia. He even devised a slide-rule to help with the assessment of the tests.

The patients were treated with convulsion therapy, although Penrose expressed doubts about the treatment to his family, insulin and leptazol, and when assessed 2–3 years later Penrose concluded that the convulsion therapy helped the manic-depressive and involutional psychosis patients to recover, the effect having worn off five years after the treatment, but that the schizophrenics were not helped. He judged the effectiveness of the treatment by whether the patients were able to leave hospital.

He was intrigued by his patients, and quotes some stories illustrating their bizarre behaviour and rationalisations. In one, there were two men in the same hospital, each under the delusion that he was President Roosevelt. Penrose asked the first about it, and told him the other made the same claim. Is he mistaken, Penrose asked? No, was the prompt reply; he is a substitute president.

He notes how such patients are clever in avoiding contradictions. In a Welsh hospital a female patient placed sweets on a shelf in the ward and said they were for the spirits. The sweets gradually disappeared during the day. And do the spirits eat them, she was asked? Certainly, she replied. In fact she was observed eating them herself.

He charted the relation between mental illness and criminal behaviour, using statistics from Europe, USA and Africa, and concluded that there was an inverse relationship between the two factors. In the US there existed an inverse relationship between the numbers of admissions of mental defective patients and epileptics and the number of prisoners received from the courts into the state prisons, and in South Africa the number of white inmates of mental institutions was more than four times the number of black, whereas the prison population showed six times more non-Europeans than whites per 1,000 of the population. Penrose commented wryly that few whites would accept these figures as evidence of constitutional inferiority in whites, but might accept an innate tendency to crime in blacks. An index of the degree of civilisation might be obtained by dividing the numbers of mental hospital patients by the number of prisoners (Penrose, L. S. Mental Disease and Criminality 1939 Brit J med Psychol. 18, 1, and Penrose L. S. A. Note on the Statistical Relationship between Mental Deficiency and Crime in the US 1943 Am. J ment Defic. 47, 472).

While in Canada, Lionel continued his painting and made pen and ink drawings of such scenes as Lake Huron and Bayfield River, the pictures being executed quite rapidly in something within two hours. He also redesigned all the items except for the last in Raven's perceptual matrices tests, with a lack of recognition which he resented.

His proclivity to make models was expressed by his collecting the wooden stick handles of ice creams from which he fashioned various moving effigies, including those of Stalin beating up Hitler and Churchill, Tojo and others in like mood. His culinary activities centred on Sundays, when he made special cream eggs which he always prepared himself.

When the Partridge family in England requested that Lionel should send them over some poison in case of capture by the enemy Lionel refused.

All his life Penrose challenged those who sought actively to eliminate bad genes from society. He maintained that genetic adaptation to environmental change would be sufficient to prevent a genetic drift downwards. Glass (Glass, B. Human Heredity and Ethical Problems 1972 Perspectives of Biolog. Med.; 237) had written with hyperbolic gloom, contemplating 'the man of tomorrow beginning his day by adjusting his spectacles and his hearing aid, inserting his false teeth and taking an allergy injection in one arm and an insulin injection in the other, and topping off his preparation for life by taking a tranquillising pill'. Penrose opposed these lucubrations and cited the opposite situation where such diseases as tuberculosis, diabetes and schizophrenia, if given current treatment, would result in the survival of many people who might then breed a progeny of susceptible children as illustrating the complexity and dangers of active intervention in the normal procedures of nature.

CHAPTER SIX

Penrose at The Galton Centre for Human Genetics, University College, London 1945–65

University College, London 1945–65

Sir Francis Galton (1822–1911), the founding father of eugenics, endowed the Galton Laboratory for National Eugenics at University College, London, in 1906 with Karl Pearson (1857–1936) as its first Director, and its first Professor on Galton's death in 1911.

Ronald A. Fisher succeeded Pearson at UCL in 1936 and Penrose was appointed Professor there in 1945, being succeeded in 1965 by Harry Harris, and Harris by Betty Robson from 1978 until 1987.

In 1945 the Penrose family returned from Canada for Lionel to take up his post at the Galton Centre, as Professor of Eugenics, University of London and Consultant Geneticist to University College Hospital, to give the full title. J. B. S. Haldane was Weldon Professor of Genetics at University College of London (UCL) and was a prime mover in this appointment. Haldane considered Penrose to be 'the greatest living authority on human genetics', with a 'crisp, incisive, pellucid mind that makes for exquisite science'. Nevertheless it was observed that it was just as well the two geneticists lived in different laboratories, Penrose on the north-western side of the college and Haldane on the south-eastern, to allow time for tempers to cool during the walk from one side of the college to the other. Haldane was an exuberant and volatile personality who would carry the attack to the opposition; for instance, if his slides jammed in the projector he would tell the projectionist that his machine was the wrong size for his slides, which caused great amusement to Lionel, who would be far too mentally honest to countenance such a remark.

Penrose kept the door of his room open at all times, and the staff at the Galton Centre came to learn that they could detect whether he was in this room by whether they could smell the familiar aroma of his herbal tobacco which would leave its trail down the four flights of stairs, thus sparing a climb up the stairs. He continued to smoke his herbal tobacco throughout his life, in spite of the work of his colleague Sir Richard Doll in establishing the connection between the smoking of tobacco and lung cancer. Penrose

managed to adhere to his respect for scientific objectivity by maintaining that herbal tobacco had not been tested as such and therefore there was no proof of its harmful effects, although, as Doll pointed out, it was the combustion of tobacco and the effects of the subsequent products which was the vital factor. Helen Brown, his secretary at UCL and then at Harperbury, became a vital force in organising his activities and imposing some order on his professional life with her firm but harmonious supervision.

Cedric Smith recalls how he was appointed as statistician to the Galton Laboratory in 1946. He was invited to tea by the mathematician Bernard Scott at Queen Mary College who, during the course of the tea, told Smith that Professor Penrose was looking for a statistician for his laboratory. Smith went to see Penrose, who asked him if he knew any statistics. No more than the hospital porter, Smith told him. Well, you must see Professor Haldane. An appointment was made for 6 p.m. a few days later and when Smith knocked at the Professor's door at the appointed time there was no reply. Smith asked someone where Haldane was to be found. How should I know, he was told. On second thoughts try that door down there. Smith knocked at a plain door with no lettering on it and was invited in, to see Haldane seated in a deckchair surrounded by calculations. We weren't expecting you till 6 o'clock, Haldane said, it being well after that time by then. Penrose wants me to test you; he thinks he might have a job for you. Have you read this paper of mine? naming an article. No. Have you read this one? No. Have you read this third one? I'm sorry, but no. I didn't think you would have done, Haldane said. Will you have supper with my wife and myself?

They went to Bertorelli's. During the meal Smith was asked what would happen to a hungry man equidistant from six plates of food? The answer was that the man would starve. When the bill came Haldane challenged it. The waitress argued and Haldane demanded to see the items. You have charged me too little, he said; that improved the situation. While walking home they came to several divisions of the road and again a discussion as the way of deciding the best way arose, but this was cut short by Mrs Haldane. Come on Professor, she said.

Weeks went by with no message from University College about the job. When Smith eventually rang Penrose he was told he had got the job and to start on 23.7.1946. A letter of appointment as Assistant Lecturer soon arrived after that, but when it came it named 1.10.1946 for the starting day. Smith phoned Penrose to ask when he should start and was told 23.7.1946. When he did turn up on that day he was greeted by the Secretary with the

remark, 'we've been expecting you for a long time'. The procedures of appointment were clearly still rather Corinthian in those days.

Smith recalls his unusual initiation rites in the department. In one, Penrose asked him whether he liked music, and being told that he did, Penrose played him a record with 25 common tunes on it, some of which were fine and some distorted in small ways, and Smith had to spot which were which; he got just one wrong.

Next he was asked to smell a liquid to say if it smelt of lemon or almonds. He was unsure. Finally Dr Holt took his fingerprints and he was in.

Penrose was elected FRCP in 1962 and used to relate with amusement how his previous work had not been deemed sufficient for the honour until then. His exultation in scientific balloon pricking may have had something to do with this (Shapiro, Brit J Psychiat 1974 125, 517–520).

The name of the department was changed to the Galton Laboratory Department of Human Genetics and Biometry, UCL in 1963, and in 1965 Penrose retired from the chair, but continued his studies on mental defect at the Kennedy-Galton Centre at Harperbury Hospital, near St Albans, where he worked until his death in 1972, and was able to avail himself of the luxury of an electron microscope.

Penrose worked fruitfully with Professor J. B. S. Haldane. In his preface to Penrose's book 'The Biology of Mental Defect' (Sidgwick and Jackson, London 1972), Haldane writes, "Beware, Penrose has the habit of presenting views which he does not share with scrupulous fairness." He mentions that Penrose would inspect the drawings of a Down's child with equal eagerness as he would give to Haldane's own charts. Penrose, in fact, considered that mental backwardness was an indictment of society in so far as society failed to accommodate such people into its social web, and referred to Sir Thomas More's (1478–1535) recounting that fools were given a place in the household in More's time, though they might be teased. The word 'idiot' originally referred to those who did not take part in society, and 'imbecile' to weak people from bacillus, a stick. The first asylum for idiots was Park House, Highgate (1840), and Essex Hall, Colchester, where Penrose worked in the 1930s, was second, being founded in 1849.

Penrose used to hold Saturday parties at UCL for his Down's syndrome patients, whom he found good tempered, appreciative of music and great mimics. His own personal reticence is exemplified by the story, told by Professor J. H. Edwards, of a family who had a Down's syndrome boy of twelve years and the mother became pregnant again. Chromosome tests of the family were equivocal, both children, after the birth of the second child,

seeming to have normal chromosomes, so the renowned Penrose was asked to see the family, which he did. When the mother rang Professor Edwards to report to him after the interview she sounded disappointed and told Edwards that she had not seen the great Professor, but had seen a very nice technician. Was he a small man with many pencils stuck in his pocket, Edwards enquired? Yes, was the reply. Well, that was Professor Penrose, Edwards told her.

On another occasion Penrose was to visit a patient at Great Ormond Street Hospital. Clearly he was not dressed in the accustomed style of a consultant, and the porter sent him round to the tradesman's entrance under the misapprehension that he was the plumber.

He did not bring his emotions to work, regarding them as vague, evasive things, not to be trusted. The door of his room was always open (Valerie Cowie) and a visitor would be greeted by the cry, "What do you want? You only come when you want something," he would say to Valerie Cowie. When Penrose saw in a journal that Valerie Cowie had joined the Genetic Society he was furious. He strode into the room and exclaimed to Cowie, "What is this that I see? Shameful!" Next day things were back to normal; he had made his stance and that was that.

The term 'eugenics' (Greek = noble in birth) had been coined by Galton in 1883, although Gregor Medel's papers on the inheritance of characteristics in beans which he cultivated and studied at his monastery had not been noticed in the obscure journal in which they appeared by the scientific world until 1900. Mendel was the first person to study the inheritance of characteristics in living things. Pearson had written a letter to Galton in 1901 after the Boer War, when Britain's comparatively poor showing in the war was attributed by some to genetic deterioration, advocating a policy of breeding from fitter stock. The policy of eugenics caused furious debates both before and after the First World War, and such society people as Emily Lutyens and Ottoline Morrell championed the cause. Fitter families were promoted to the extent that there were entries at country fairs for such families in the human stock sections. The eugenic society members received 300 summonses at their meeting in America in 1926. All members had a medical examination, WR test and psychiatric assessment and IQ test.

Penrose was not the only one who was furiously opposed to the notion of eugenics. G. K. Chesterton commented that committed eugenicists had managed to combine hardening of the heart with a sympathetic softening of the head.

Penrose considered that it was an indictment of society when accommodation could not be made for mentally backward people to join in the social web. In a lecture in Birmingham he said of the term 'degenerate' which was often used to describe these people, that "It is customary to use the term to designate the peculiarities of individuals belonging to a social sphere different to that of the user. In the upper classes poverty is sometimes regarded as evidence of degeneracy. Similarly, the poor can complain of the degenerate, idle and dissolute behaviour of the rich."

At the conference on human genetics at the University of Chicago in 1966, Penrose said that, "The social and biological values of hereditary differences are continually altering as the environment changes . . . at the moment our knowledge of human genes and their action is still so slight that it is presumptuous and foolish to lay down positive principles for human breeding. We all take part in the same gigantic experiment in natural selection."

Penrose cringed at the title 'Eugenics' in his chair at UCL. He managed to change the title of the journal from 'The Annals of Eugenics' to 'Annals of Human Genetics' in 1954, but it took until 1961 before he could persuade the UCL authorities to alter his own title to 'Galton Professorship of Human Genetics'.

Cyril Burt contended that the national IQ was falling; with larger families, if intelligence was hereditary, the world population would all be defectives in the end. Social aptitude was not an appropriate way to classify people, Penrose countered, such classifications being about as much use from the biological standpoint as a classification of aquatic organisms based upon their suitability for consumption as articles of diet.

Voluntary sterilisation ran parallel with eugenic views, and many of the semi-independent states in America gradually legalised the operation during the 1930s. Penrose opposed sterilisation as a way of genetic control, and said that the race must not be genetically frozen, needing variation to cope with the changing environment. He instanced figures in a simplified model whereby intelligent people (AA genetically) might be less fertile but this was counterbalanced by the heterozygotes Aa who were more fertile and would produce enough aA offspring to replace the AA deficit of the intelligent breeders, and aa people being less fertile, thereby maintaining the genetic variation which was the energy of the species. Likewise the aa people tended to be less fertile, while few people with IQs lower than 35 bred at all.

CHAPTER SEVEN

Diversifications

The wide range of Lionel Penrose's intellectual life will become manifest when his hobbies and interests are discussed.

Music

While still a medical student Lionel had continued his non-medical interests, of which music was an important component. He annotated musical manuscripts of harmonised but distorted tunes, where the harmonies are correct but unusual and in which the viewer had to spot the distortions. In 1926 he was writing musical palindromes, possibly out-doing Haydn in his endeavour, and composing music which could be turned upside down and played without a break in the progression of the piece, starting at either position.

It is commonly held that an affinity for mathematics and for music exist together in people and a better example of this association would be hard to find than that of Lionel. From his earliest days at school he both performed and composed music with the problem, for his friends, of spotting the distortions when they occurred.

When he was sixteen, at Leighton Park School, he composed a minuet and trio and a double chant in canon, an effort which the judges warmly encouraged. He was also recorded as playing the piano, accompanied by Roland on the 'cello.

In the 1940s he was writing his 'Harmonised and Distorted Tunes', tests in which the viewer has to spot the distortions of tune, the harmonies being correct but unusual. One is reminded of Schonberg's cry to his pupils when they spotted him breaking his own rules of composition: 'I allow it now, I allow it', he would exclaim. Lionel had written eight musical palindromes in 1926 (fig. 8) and clearly delighted in linking his mathematical exuberance with his musical ideas. When the pieces were turned upside down the accidentals would attach themselves to a different note. He claimed that his musical palindromes were superior to the ones Haydn wrote, as the latter was not so good with his accidentals.

He became proficient on the piano, spinet and virginal, and possessed a double spinet and a piano at Rodborough Road and a grand piano at

Palindrome in F Major

* *turn upside down and continue*

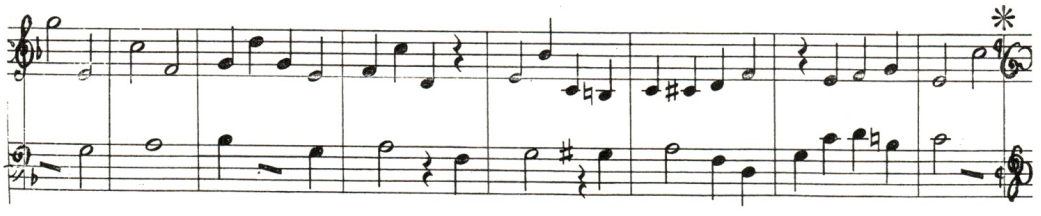



Fig. 8. Musical palindrome by L.P.

Thorington Hall. He could play both the piano and set mathematical puzzles at the same time, but some of the family found a lack of emotional involvement in his playing. He was very fond of the music of Bach, although Mozart probably took first place, and when on the ship to the USA in 1958 with Margaret and Shirley, when they were travelling first class with some misgivings about the ostentation implicit in that category of travel, he heard, in the distance, on the first afternoon some piano music which sent him scurrying to the source of the sound. He was told by the pianist that he was playing a Bach transcribed organ fugue. The pianist apologised, mistakenly thinking Lionel had come to complain, and went on to say that he only played such music on the first day of the voyage when there were few people about, and promised Lionel there would be no more transgressions.

Music ran in the family. In the 1960s Margaret played the 'cello, which she took up relatively late in life, Frances Partridge the violin and Shirley the viola, and they enjoyed their trios together. Margaret was beginning to be hampered by deafness and her standard of playing was not great.

Lionel and Margaret both enjoyed listening to music, with Haydn and Mozart popular, and also opera, although Margaret developed a fear of falling asleep during the performances, perhaps due partly to her deafness.

It seems that, unlike Charles Darwin, scientific preoccupations did not interfere with Lionel's enjoyment of music.

Chess

Lionel start playing chess at school, and performed creditably in a tournament at school in 1912. The momentum built up so that he was awarded a half blue for chess while at Cambridge University. The whole family would play the game, all with considerable skill, with Margaret holding her own and Jonathan the chief exponent. Once, when Margaret had entered the

Women's British Championship competition, Lionel's conflicting attitudes to this caused such tension that Margaret withdrew from the competition; on the one hand he did not consider it a suitable endeavour for Margaret, and on the other he was agonised as to whether she would do herself and the family full justice. Lionel himself was chess champion of Colchester in the 1930s. His affinities with Russia and with chess augmented each other so that he was organiser of the Anglo-Soviet Chess Circle in 1947, a competition which Russia won, held in the Bonnington Hotel, London.

Lionel wrote (UCL Archives), perhaps with his tongue in his cheek, a paper on psychoanalysis and chess in 1925. In this article a subject asks his analyst why he dreamt about chess and the analyst replied that it probably portrayed his infantile family conflicts on the chessboard. In such dreams the White Knight represented the grandfather and the Black Knight the father, with the Black Queen as the governess and the white Queen as the mother. The object is to kill the father but the dream stops at check-mate when this is inevitable. In the earliest forms of chess, called chaturanga, there is a queen but a later Persian game had a councillor who became familiarised and turned into the Queen, contemporaneous with the rise in importance of women in society in the 15th Century. The Knight and Bishop were equal in power, representing Jacob and Esau, and the castleing of the King performing an anal function to retain faeces, the jump of the Knight corresponding to an erection. Lionel suggested that chess retained its spell by fulfilling sadistic fantasies.

The archives at UCL contain notebooks of Lionel on chess games and manoeuvres, and a memorandum suggesting a scheme for improving the British Chess Championship in 1951, in which he was the President of the Anglo-Soviet Chess Circle. Also in the archives are newspaper cuttings of chess games, some played by Jonathan in the 1970s.

Typical of his inventive and subversive mind, he devised games of chess in which the object was to lose rather than to win.

Art

Lionel possessed considerable talent in drawing, probably an endowment influenced by his father, James Doyle Penrose, who was a portrait artist of considerable skill, including a fine picture of his father-in-law Alexander, Lord Peckover. The latter married a Sharples, reinforcing the artistic leanings.

When he was five, Lionel produced creditable pencil drawings of flowers, followed by crayon drawings a year or two later (Archives 3/1).

Fig. 9. Bookplate by L.P.

At Downs School he made books of pressed flowers and drawings of insects such as ladybirds, accompanied by notes about their habits, and when he was at Leighton Park School he produced a story in words and pictures (Archives 4/1) and while still in France during the First World War he made pencil and charcoal sketches of the war-damaged buildings and countryside.

He continued to paint in oils and to draw all his life, and made meticulous drawings of the trees in the garden at Thorington Hall, matched by his depiction of the ridge patterns of hand prints (UCL Arch, 94/1 and 3).

Perspective Drawings and Models

Roger Penrose loved to make models, and his father caught his enthusiasm. They worked together initially and when, in the late 1950s, they produced their plywood reproducing models, Haldane was both entranced and jealous, wishing he had thought of it himself but Francis Crick considered the model as an insult to nucleic acid after people had drawn likenesses between the two repeating patterns. Crick and Watson had published their paper on deoxyribonucleic (DNA) in 1953 (Cold Spring Harbour Symposium on Quantitative Biology XVIII, 1953). Crick sent a letter critical

of any relevance of the wooden models to DNA in 1958, to which Penrose, quite characteristically, replied in courteous and attentive terms.

Penrose paid tribute to the mathematician von Neumann for kindling his interest in this line of thought. The wooden models were cut in Lionel's garden shed with a foot-driven saw, and he would wander about the house chipping away at the models to produce the carefully planned and crafted notches and shapes, with Roger as his chief helpmeet. Roger had suggested magnetism and then springs as possible means of interlocking before notches were worked out by the two of them, the process depending on shape and gravity. The wooden blocks were some four inches long and one quarter of an inch thick. They were so shaped that if placed side to side in a track, the track being likened to a facilitating enzyme, and shaken horizontally, they would remain separate, but if two were locked together beforehand this pair's ends became tilted so that they now interlocked with their neighbours when agitated. The neighbouring pieces then themselves became tilted and so repeated the process. The apparatus was named the

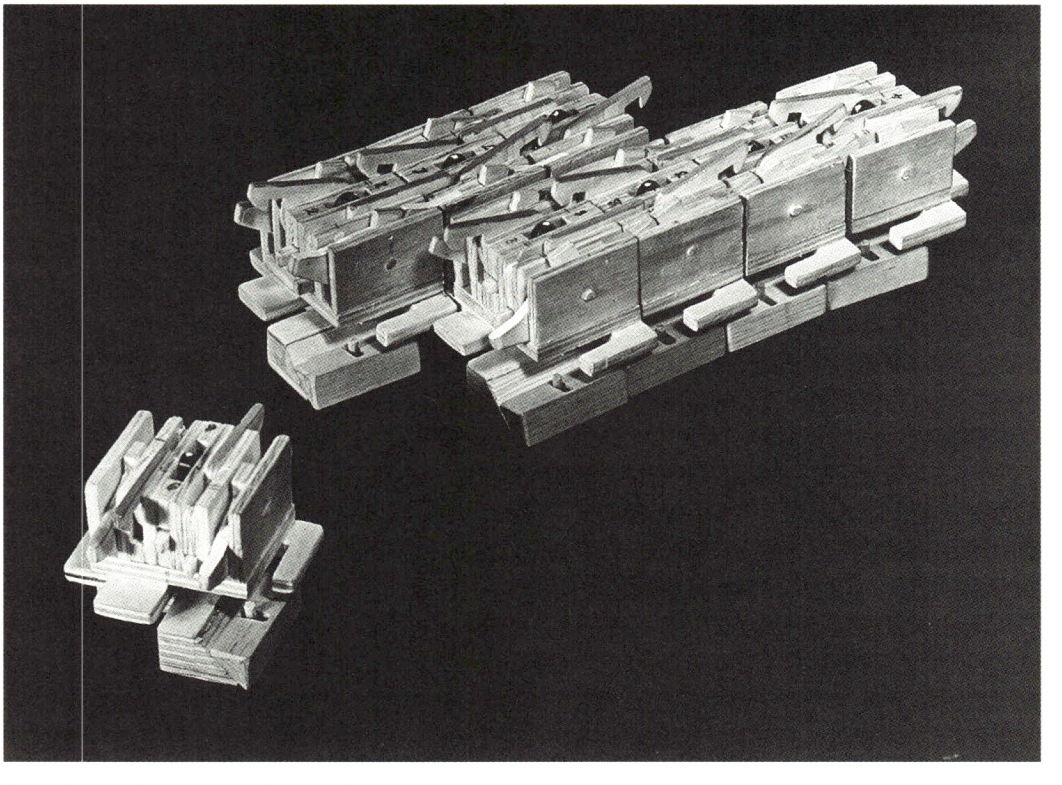


Fig. 10. Interlocking wooden models.

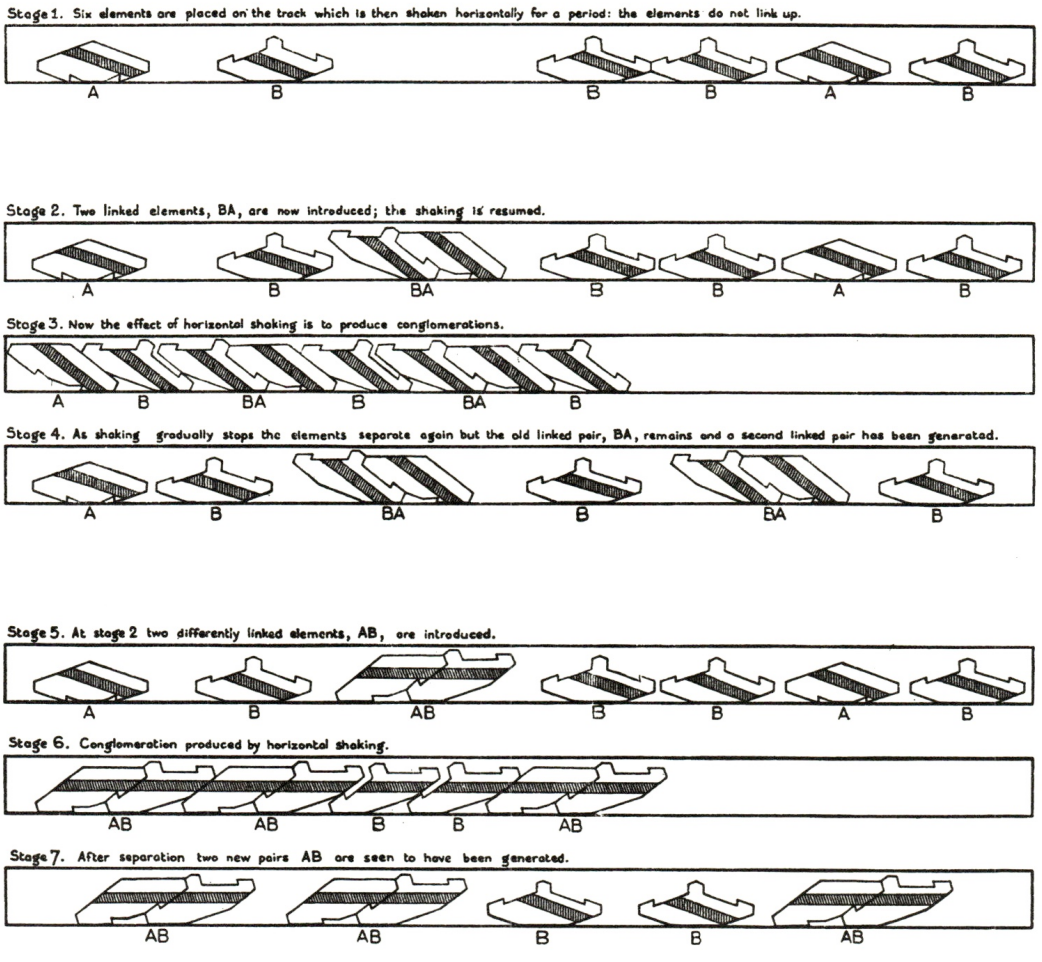


Fig. 11. Model to show self replication, made with two types of element, A and B.

Drogulus, a name used by A. J. Ayer in a radio broadcast for a mythical creature in his philosophical writings, the sound of the word recommending itself to Penrose (Nature 1957 179, 1183). Later wooden dogs which went round a track were produced, and a wooden block hollowed to a bowl-like concavity on its upper and lower aspects, the two concavities being connected by a narrow channel through the block so positioned that if a liquid were placed in the upper concavity and the whole block was then slowly turned upside down the liquid would appear in the second concavity, now uppermost, and thus seem to defy the laws of gravity by not spilling out onto the floor.

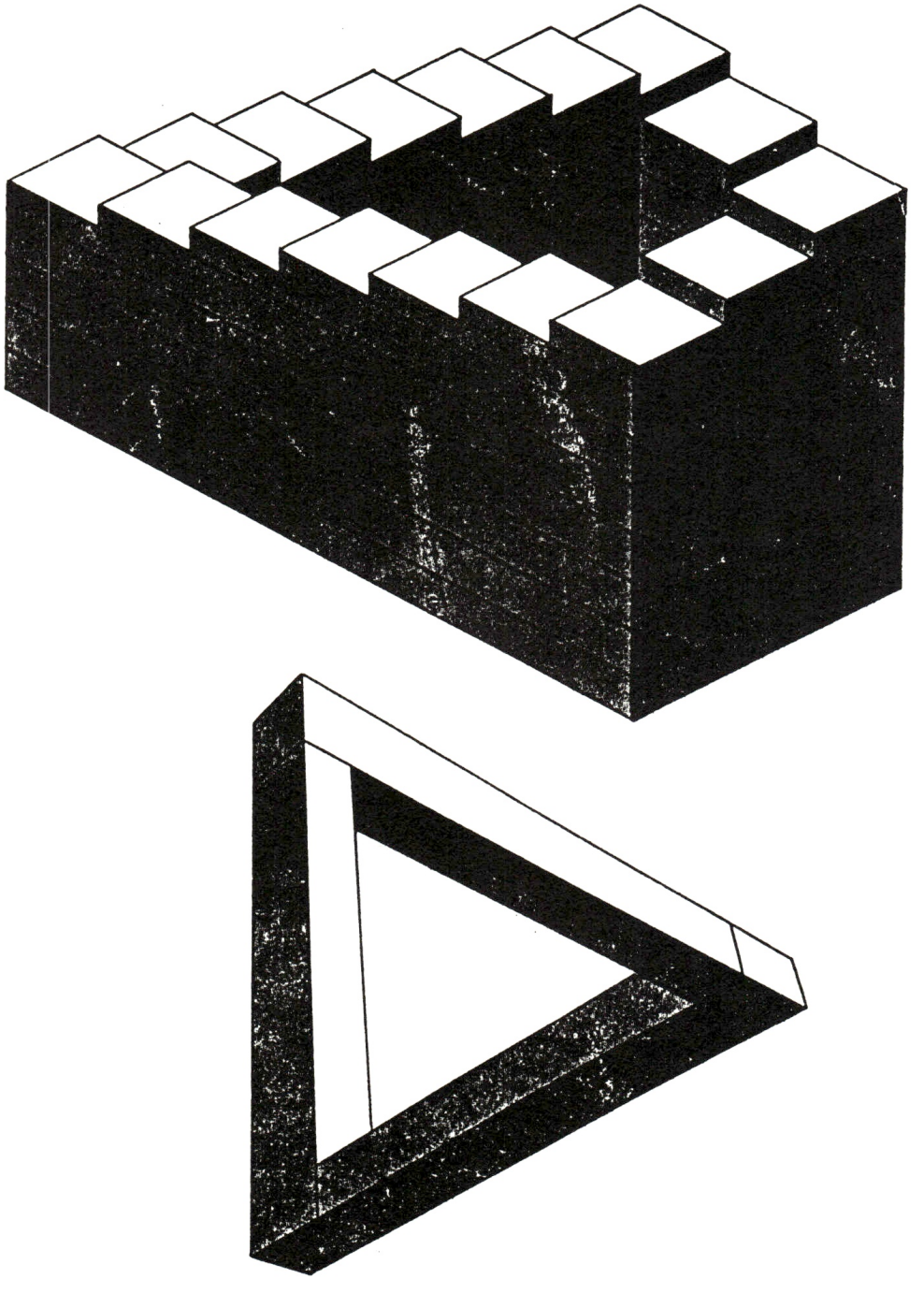


Fig. 12. Drawings of perspective.

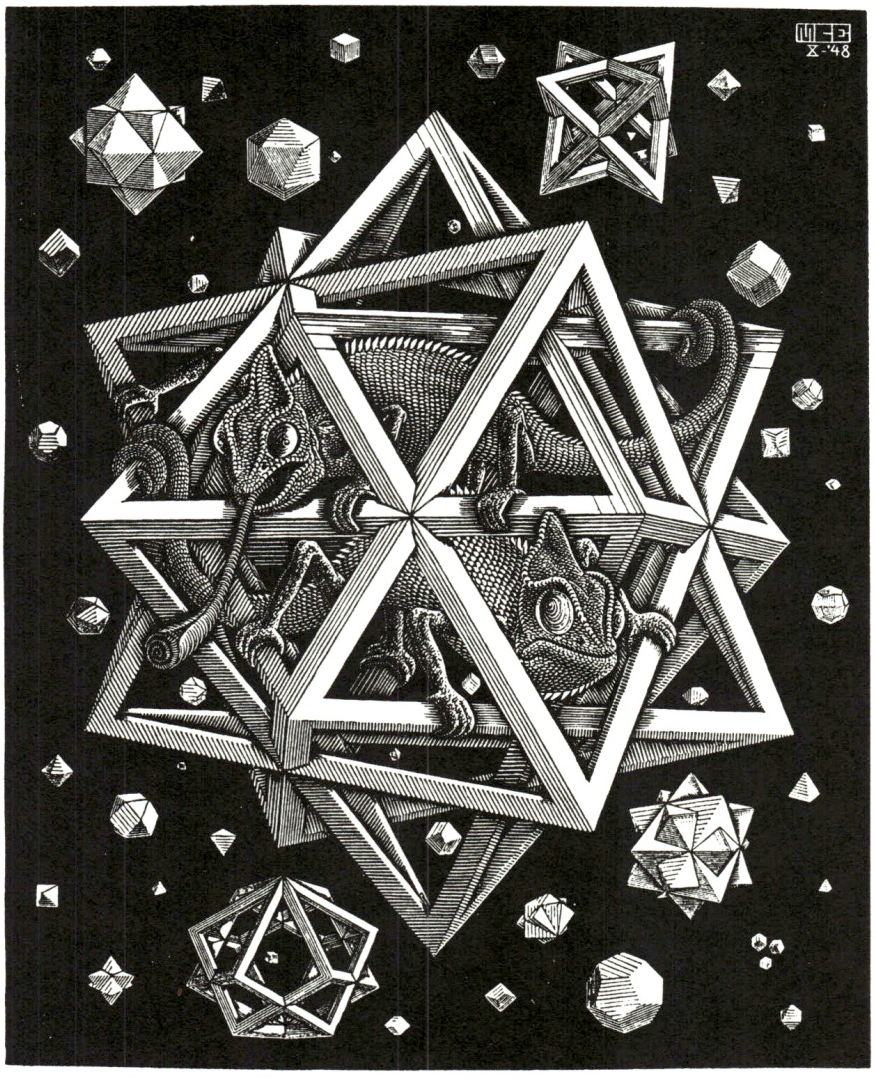


Fig. 13. Drawing by Escher.

Later more complex models were constructed, some of which are stored in the Science Museum, London, and the relationships with biological systems were explored (Ann. of Human Genet. 1958 23, 59–72). A similarity between trouser zips, first introduced in America in the late 19th Century, and these interlocking systems was made (Scientific American June 1959 200, 105) but it was pointed out that the zipper hooks did not start completely separate and that only one line of connection was formed by them. Further developments in this sphere were discussed by

Penrose in New Biology March 1960, in particular in relation to DNA and RNA, and a society Artorga (artificial organisms) was founded to foster research, leading eventually to the science of cybernetics, California being described as a syrup of systems. In 1961 Penrose was lecturing to the Institute of Contemporary Arts on the subject.

Lionel derived his delight in the paradoxes of perspective from his son Roger, which led him to draw never-ending staircases accompanied by a never-ending tone produced by the sound of a ball on a staircase which Roger Shephard had evolved, the stairs seeming to go up or down according to the viewer's inclination. This paradox of perspective transferred itself into the work of the Dutch artist Maurits Cornelius Escher (1898–1972) who produced many lithographs and wood engravings of stairs and banisters revealing the paradoxes of perspective, the shapes of stars, a dragon, birds turning into buildings and part-birds turning into a chess board (Witt Library, Somerset House, London). Escher's art became something of a cult and the artist had the doubtful distinction of having wrapping paper bedecked with his designs (fig. 13).

As a result of his work on patterned perception tests in Canada, which revealed discriminants between psychotic and normal people which did not depend on language, and could be used for IQ tests, Penrose made replicating drawings and refashioned and illustrated Raven's matrices, for which, incidentally, he received no acknowledgement. The impossible object was a creature from Roger's imagination, and this also appeared in the book (Gregory, R. L. Eye and Brain; Weidenfeld and Nicholson, London 1979 p 223). This was a wooden model of a triangle, with the triangle split and to be viewed so that the split was not visible (fig. 12). Later, Gregory also made such a model. Roger was Penrose's chief collaborator in the family in these enterprises.

There is a notebook (family possession) in which he has drawn a number of puzzle problems, with the solutions later in the book. Examples are "The Bewitched Individual" whose expression of gloom can be changed to one of mirth by a certain manoeuvre; "The Unfortunate Dog" who has to be released from a knotty problem; "The Transparent Waistcoat" which must be removed without untying anything or undoing any buttons; and several others.

Derematoglyphics

It was almost inevitable that hand prints would attract Penrose's attention and he wrote an article (Nature 1965) rejoicing in the mathematics of

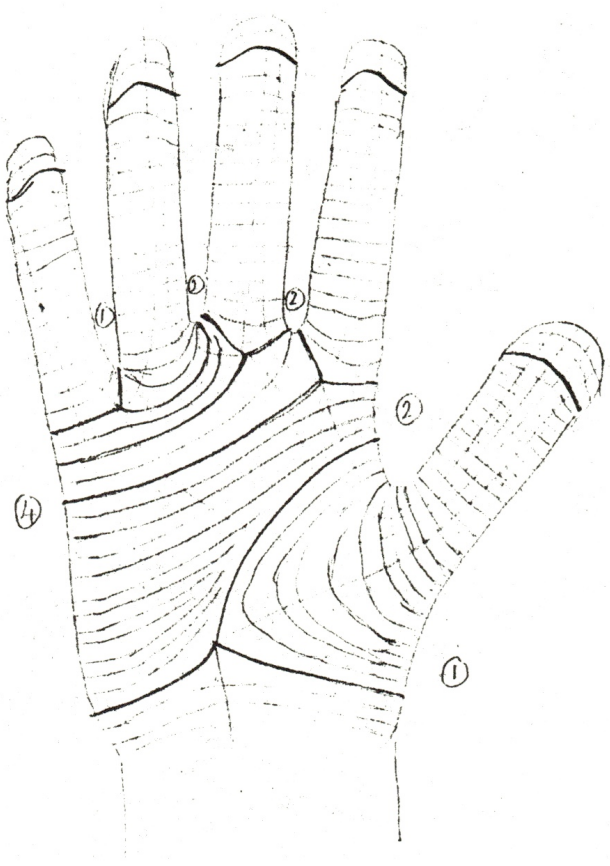


Fig. 14. Derematoglyphics by L.P.

fingerprints, with their loops, arches, triradii and whorls, and their normal proportions and relationships. There are beautiful and meticulous drawings and calculations of ridges which he did both while in Ontario and while at the Galton Laboratory. Later he lectured in Warsaw, Poland, on the subject of dermatoglyphics at the Polish Academy of Sciences (1971) at a conference on dermatoglyphics and human genetics, in the course of which there was much mathematics. Can one imagine a more congenial group of subjects for such a one as Lionel Penrose? He was not a trained mathematician (C. Smith) but a good, intuitive one.

He wrote (The Psychology of Mathematics 1924): 'When a person is sufficiently developed to realise that merely a belief in magic does not have a magical effect on the world, he can fall back on a sounder method of creating wonders. He produces an apparently impossible or surprising effect by perfectly ordinary means. The conjuror or maker of puzzles

creates just such a circumstance.' He warns of the danger of an obsession with numbers, citing Kant and Copernicus and relates how when he himself was nine he felt the compulsion to count up to one million, admitting that he faltered at 50,000. He discusses the similarity between mathematical processes and the reproduction of children, in which two ideas connected together in a certain way produce new ideas of the same kind. Children are like magic, the essence of which is to produce something from nothing. He speculates that the dearth of female mathematicians may be connected with their role as the producer of children.

Anti-Shakespeare Society

The Pen Club was a focal point for this society, of which Lionel and Christmas Humphreys were leading enthusiasts; Frances Partridge, Ruth Hoffman and Betty Robson all became involved, Lionel's doubt concerning authorship possibly stemming initially from his contact with Freud.

Calculations of word frequencies and rhythms were made which purported to show that Edward de Vere, 17th Earl of Oxford, was the rightful author, notwithstanding the inconvenient fact that the individual died in 1604. He had, however, travelled widely in Italy, where many of the plays were set. Lord John Lumley, another contender, (1534–1609) was a kinsman with a fine library at Arundel and the founder of the Lumleian Oration, an annual event at the Royal College of Physicians, London from 1583. Frances Bacon was ruthlessly ruled out as a non-starter.

It may be pertinent, or perhaps impertinent, to observe that Lionel was not fond of literature, possibly a legacy from his Quaker upbringing. He seldom read novels and did not relish actually attending performances of Shakespeare's plays, although he liked reading them and appreciated their greatness. He also liked to read the daily papers. He wrote an article on Shakespeare's knowledge of medicine in 1964, in which he quotes from Simpson, R. R. Shakespeare and Medicine Livingstone, Edinburgh and London 1959, who found 712 references in 37 plays. In particular Hamlet's father's murder by Henbane (hyoscine), with Pliny (Natural History XXV, 4, 17) mentioning oil of henbane reaching the brain via the ear.

Pacifism

Sir Alexander Haddow (The Times; 1972 May 22) referred to Penrose's espousal of The Medical Association for the Prevention of War, and

commented on the influence on Penrose of Wilfred Trotter's book 'Instincts of the Herd in Peace and War'. Penrose regarded war like a disease, useless and harmful, but recognised that the human race needed a replacement for war. The Medical Association for the Prevention of War was formed at a conference at the Royal College of Surgeons, London in 1951; J. B. S. Haldane and Richard Doll were other members. A letter was drafted to The Lancet expressing the views of a small committee of some ten members, but it was only after days of deliberation that a wording could be agreed upon by all the members. Finally the day for signing arrived and Sir Richard Doll, the Chairman, in some confidence, made one last request that could they all now sign the letter? To his dismay, the hand of Penrose was raised. His heart sinking and fearing the worst, Doll asked what was his objection? 'I can't accept that comma there', Penrose replied with a straight face, and indicated the offending mark. Doll breathed a sigh of relief and the comma was despatched. Margaret Penrose became Editor of the Bulletin in 1959, and at a conference in Oxford in 1962, 'The Pathogenesis of War' was the theme. Penrose expressed the view that the moral reactions of crowds was brutal and infantile compared with those of individuals.

In a journal called 'Peace News' in 1956, Penrose reviewed the effects of a nuclear explosion and it was at a talk he gave to the Quodlibet Society at Guy's Hospital that he reiterated his opinion that war was a disease. In a Peach Research Group paper in 1962 on the pathology of group behaviour, Penrose expressed agreement with A. J. P. Taylor that nationalism led to war via a concatenation of normal reactions, war being seen as a behavioural problem.

The meteorologist, Louis Fry Richardson, who had been a member of The Friends Ambulance in France in 1916, had thoughts on the weather and on pacifism: In the first category he considered that if the Albert Hall were filled with meteorologists they would be able to predict the weather accurately; and in the second, that there should be established an academic investigation into the causes of war, for instance, would prayer have an effect? Did a common language encourage or retard war? Lionel was interested in this and was a keen supporter of the Medical Association for the Prevention of War.

One result of his interest in 'Crowd Behaviour' was the development of the idea of square root voting, which he propounded to, amongst others, The University of London Humanist Society. On the opinion that one vote among many had a diminished effect compared with one vote

among few, he suggested that, where large groups of different sizes were involved in voting, the number of votes allowed from each group should be proportional to the square root of the voting population, a formula which might suit, for instance, the voting among the United Nations or China.

The Porcupine Man

In the 1950s Penrose and his wife became interested in the family history of a condition known at the time as the porcupine man, now called Icthyosis Hystrix, This interest was instigated by the visit to Britain of an American scientist who maintained that the condition was carried on the Y-chromosome, a proposition which Penrose doubted. He was galvanised into action when he saw an illustration on the front cover of a textbook of genetics showing just such a mechanism. The first instance of the condition had been recorded in 1731, and was then passed on to son and grandson; it was therefore considered to be carried on the Y-chromosome but Penrose had his doubts and undertook a meticulous tracing of the family records, as a result of which he discovered evidence of affected girls, who had mostly died young and therefore escaped recognition.

John Machine of Euston Hall, Suffolk, an astronomer and developer of methods of calculating, and a person after Penrose's own heart, mentioned the Lambert family in the Transactions of the Royal Society in 1731. Edward Lambert's skin was covered with scales to the extent that he was considered by many to be a different species of mankind, although he was normal at birth, and the skin cleared when he had smallpox. His mother had received no fright during her pregnancy. He fathered six children, five of whom died young and one son, John, who survived. John fathered two affected sons and a normal daughter, but after painstaking searched in parish registers, Penrose found records of two other girls who had died young, almost certainly from the same skin complaint.

Both Lionel and Margaret shared a great interest in parish and church registers and they travelled widely in East Anglia in their pursuits. Penrose said, in a broadcast which was published in the Listener 9 May 1957: 'Until recently it was thought that the outstanding problems of human heredity could be adequately investigated without moving from an armchair. This method is now believed to be inefficient and it occurred to me about a year ago that more active research might help to elucidate even the porcupine man.'

CHAPTER EIGHT

Harperbury Hospital, St. Albans, 1965–72

This hospital holding 1600 mental defective patients was run by the North West Thames Regional Health Authority. Penrose had attended the hospital intermittently before, but in 1963, when he received the Kennedy Award, he invested the £20,000 he was given to equip a centre for a clinical genetic service, known as The Galton-Kennedy Centre for Mental Retardation Diagnosis and Research. He even, such was his nature, gave away his personal allocation of £3,000 from the Kennedy Award to individuals for their requirements in the unit, to the extent that the sum of his gifts exceeded the total of the award. Dr A. Shapiro was the Medical Superintendent at Harperbury, and Penrose and he got on well together. The money for the award had originally been amassed by Joseph P. Kennedy, the father of John F. and of Rosemary, who herself was mentally retarded (Michael Ridler).

The rooms along a disused corridor of the nurses' home were given to the unit by Matron, and a laboratory set up, known colloquially at 'The Virgins' Retreat'. For these premises microscopes, and later electron microscopes, incubators and fridges were procured. The unit started to function in 1964 and was officially opened in 1965, the year of Penrose's retirement from UCL and the year he began to work at Harperbury full time. Funding came from Medical Research Council (MRC) grants, and from personal grants from such as the Rockefeller Foundation and the Crippled Children Organisation.

Penrose continued to live at Rodborough Road, Golders Green, London, and drove out to the hospital in his car, usually a decrepit Fiat 500. Regular service of the car was not a prominent feature and the vehicle frequently broke down: the fan belt would break and ladies' tights have to be found for a substitute fan belt or the petrol or oil would run dry; the gear box would jam. At other times he would stop to ponder. Apart from these interruptions, if he reached his destination, Penrose would sometimes forget that he had travelled by car, and take the bus home at the end of the day. His dress might be said to be appropriate for any exigencies that the car might impose, in that his clothes were variable around a mean of that described as 'professorial' in the lighter articles about academics; in winter

he would have a scruffy cardigan and a hug scarf would be wound round his neck. He continued to smoke until the end of his life. In the unit he was known as 'Prof', and brought his own sandwiches which he would eat, if he remembered to, at convenient moments.

Soon the team's expertise was sought by local hospitals such as the Cell Barnes Hospital, Leavesden and St. Lawrence's, Caterham, but also from all over the South of England, with requests to visit children and their families at home, and cytogenetics, cell suspensions analysis and dermatoglyphics were added to the list of services provided. Organic causes for mental retardation were particularly sought. Dermatoglyphics, in particular, excited Penrose's interest, combining, as it did, the meticulous drawings of ridges, loops and whirls with the measurement of angles and ridge distances, providing one of the few quantitative traits susceptible to polygenic analysis.

Although Penrose was a patient teacher of children and the mentally backward, he was less successful with adults. He would tend to expect them to get on with whatever they were doing, and if he did not receive the response he expected, such people might be ignored. His own abilities with charts and figures were prodigious, and he would spot a tiny error in a trice. Once, when the logarithm tables he needed were not available, he wrote out those that he wanted from memory.

He was very interested in the early model of a calculator made by Charles Babbage (1792–1871) which is now in the Science Museum, London.

He continued to work at Harperbury until the end, perhaps with some abatement of his faculties in the last year or so, but making light of his angina. Understandably he became rather less accessible and more acerbic, so that his response to Valerie Cowie, when she told him at the Royal Society of Medicine about her work on phenylketonuria and that it might be that extra phenylalanine would help Down's sufferers, he responded gruffly, 'Why don't you give them bananas then?' Having been at work on Friday, he died on the following Sunday of a heart attack. The Kennedy-Galton unit was moved to Northwich Park, Harrow, Middlesex in 1987.

CHAPTER NINE

Lionel's Family

Margaret Penrose had worshipped her father and admired her mother, a professional pianist, although she was terrified of her. When she married Lionel he became pre-eminent in her affections, and she rejoiced in his agile mind and humour; there was never a dull moment in his presence. She gave him genuine flattery, which Lionel basked in. She was a keen member of The Peace Movement, serving on many committees. She played chess with more than average ability, but in the intense competition of the other members of her family her prowess was not allowed to flourish, owing to Lionel's mainly unconscious objection. There must be few people who can declare, as could she, that they have five close members of the family who became Fellows of the Royal Society; such were her father, first husband, second husband and two of her sons. Margaret was a genuine socialist, and was no gourmet; rather she favoured the allurements of packaged and processed food. Lionel was not cognisant of some of the modern methods of food preservation and preparation and was once taken unaware by a frozen bird, which he dropped when he was surprised by its unyielding texture.

Lionel would say things as a challenge, often presenting new arrivals at the house with some puzzle to solve, and the family atmosphere did contain a strong element of competition, not to everyone's liking (Roger, BBC Devout Sceptic 23.7.95). On the other hand, he would be reluctant to discuss emotional matters, and if challenged with queries at a time when he was concentrating on some task he would either fail to register the instrusion, or merely acknowledge it with a quick glance. He would pent up his emotions, but then the dam would burst in a sudden flash of anger. Roger remembers how his father exploded when Roger and a friend were about to embark on the friend's motor bike to the Farnborough Air Show, and Lionel's mounting distaste for what he considered to be a dangerous expedition suddenly broke forth, to the friend's dismay. A similar occurrence took place at the start of a proposed hiking holiday.

The couple's first child, Oliver, was born in 1929. Lionel possibly gave him more of his time than he did the other two sons, at least until they were mature, but he was concerned with his daughter's doings all through. Oliver

was precocious and good-looking, rapidly learning to play the piano and cello and taking readily to mathematics and chess.

Roger was born in 1931 and accepted the standard Christian beliefs and practices for the first ten years of his life, until he recalls someone in his family putting a direct question to his mother as to whether she believed in God and the Christian faith, and her embarrassment and bewilderment how to reply, which eloquently conveyed to him her own lack of conviction. After that agnosticism, combined with strong ethical standards appropriate to the Quakers, such as espousing peace rather than war, honesty and fair-dealing, held sway in the family. Roger also took to mathematics readily, played with the intricacies of assembly puzzles and impossible objects and later extended his interests into physics. He was also perhaps the chief agent with his father in making the wooden models and drawing the many puzzles that appeared, often dealing in the perplexities of perspective, which Lionel delighted in. To illustrate the chances of fate in real life, Roger's first major post at Birkbeck College, London was initiated by a chance encounter with Cedric Smith on the underground railway.

Jonathan was born in 1933 and joined, and eventually led, the family brigade on the chess board, ultimately to the extent of becoming British Chess Champion and holding the title for ten years, for which feat he was awarded the MBE.

Shirley was born in Canada in 1945 and followed the family tradition of combining a scientific and medical career, being the only one to interest herself particularly in medical genetics, her father's principal field of work. She took an appreciative and active part in the world of music, playing the viola and enjoying opera.

Lionel delighted to teach people in order to convey to them the joy he obtained from his own interests, sometimes, perhaps, expecting rather more from his recipients than they could readily provide.

Lionel had been one to hold emotions at bay, regarding them as largely unreliable and unquantifiable, and therefore not worthy of serious attention. On the other hand, among those who worked closely with him, he was considered a man with strong emotions and one who was extremely warm-hearted. For instance, the Science Society at UCL had never elected a professor to its membership, it being recognised that the professors had their own association, until they elected Lionel. He had been proposed on the grounds that he was the most popular professor, this in spite of the fact that he could be a tiger in committee.

ENVOI

If this account has not made manifest that Lionel Penrose was a remarkable man, then it is the fault of the account and not that of the subject.

His diverse faculties gave rise to many opinions and assessments as he is viewed in his different aspects, but if there be no consensus in the detail there is almost universal agreement in the concord that this multi-faceted man was remarkable.

However, intermingled with these zones of high renown, there are a few places where the going is a little more rough and some analysis of these latter areas might be expedient to balance the scales.

The sojourn in Canada during the Second World War is perhaps just such a zone. At first sight it might seem craven to desert Britain in her hour of need, but on closer thought this aspect changes for the better. Penrose never hid his abhorrence of war; if the opportunity came to avoid the conflict then it would be consistent for him to do so. Many a less honest person might try to side-step the issue by taking work such as coal mining or land work, but Penrose was of the cast of mind in which he would not seek to hide behind what might, for him, have seemed to be an expedient; rather would he prefer to face any consequences full on and leave it at that.

Again, it could be considered that he gave less time to his family than he should have done. However, the subsequent careers of his children hardly support such an idea. Should he have been more cosy at home? Would Margaret had liked that, or did she prefer to see his talents stretched and burgeoning? Possibly even she could not have answered that question.

His fairly consistent anti-establishment posture might be criticised by some as being something of a pose, but on careful consideration it appears that he rally did believe in his own unorthodox attitudes and conclusions. That not Shakespeare but the Early of Oxford wrote the famous plays is one of the more indigestible items in this category.

Certain it is that the world has benefited from the life of Lionel Penrose to a degree which places him in the premier league of benefactors.

When the author rang Sir Richard Doll to ask if he would have a chat about Penrose, the latter chuckled. It seemed an appropriate response in reference to someone so quirky. One feels that Lionel would have been pleased at that reaction.